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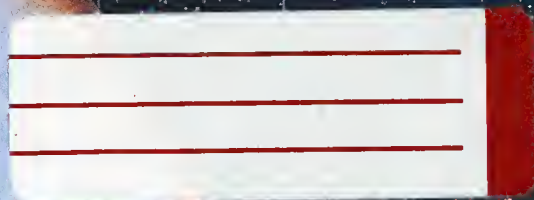
The Magazine for CP/M Users March 1987

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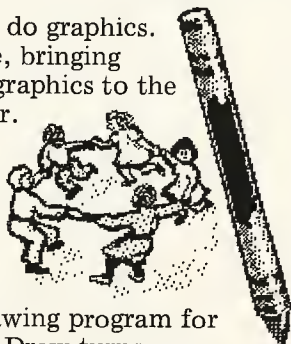


"Kaypro makes a nice computer- too bad it doesn't do graphics"

Graphic
Designer



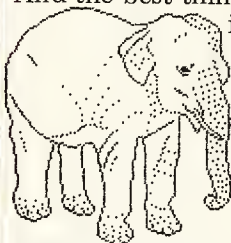
Make that *didn't* do graphics. SCS-Draw is here, bringing Macintosh-style graphics to the Kaypro computer. With SCS-Draw, you can use your Kaypro to draw a picture. Of anything.



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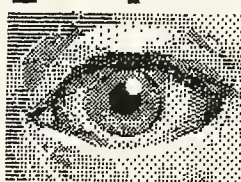
There are many applications of SCS-Draw. For example, you could use SCS-Draw to design and print party invitations, banners, or technical diagrams. You could also use SCS-Draw to promote your business or design your company logo.

And the best thing about SCS-Draw is that it's fun to use — when was the last time you had some fun with your Kaypro?



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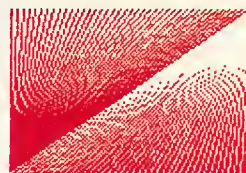
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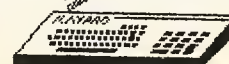
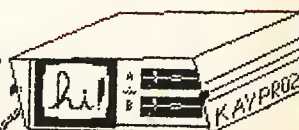
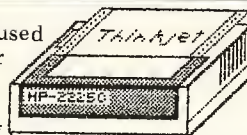
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TYPESET



Happy Birthday

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PROFILES

The Magazine for CP/M Users • Volume 4, Number 8 • March 1987

FEATURES

Printing the 22 Light Fantastic

BY ROBERT J. SAWYER

Will the laser
printer replace
the daisywheel?

Mailing List 28 Managers

BY JOSEPH COMANDA AND
LUCIEN KRESS

Not too big and not too
small – these programs
are “just right”

Artificial 33 Intelligence Programming Languages

BY RICHARD WARNER

A thoughtful look at
what's available for CP/M

Making Perfect ... 38 Calc Count

BY JAMES SPENCER

Linking spreadsheets to
create an accounting system

Surges and 41 Spikes are Not Very Nice

BY JAMES CARUCCI

Protect your computer
and peripherals from
power disturbances

Making Menus ... 48 with MailMerge

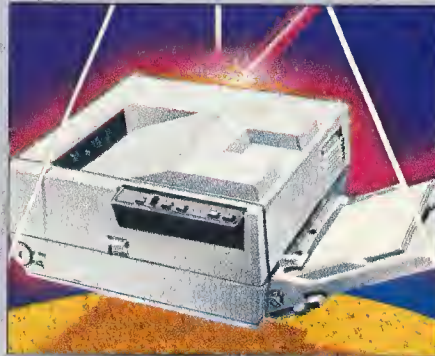
BY JOSEPH COMANDA

Put your form letters
into a custom menu
system

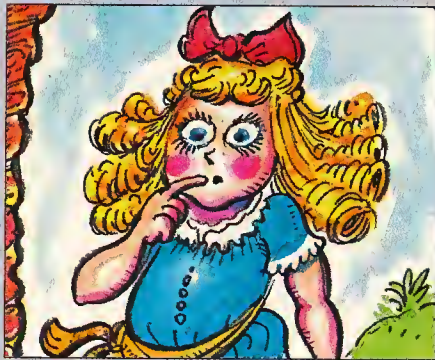
The Basics 50 of BASIC

BY JERRY HOUSTON

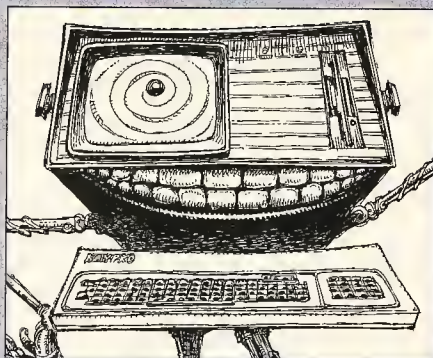
Part 2: Cultivating
order and efficiency



Light Fantastic 22



Mail List 28



AI 33



BASIC 50

DEPARTMENTS

About PROFILES ... 4

Editors' Notes 4

Letters 6

Q & A 61

Technical Forum .. 64

Tip Trader 66

New Products 69

Product Updates .. 71

Advertisers' Index . 72

COLUMNS

Flea Market 12

BY TED SILVEIRA

Life at 300 Baud .. 14

BY BROCK N. MEEKS

First Impressions .. 18

BY TOM ENRIGHT

Beginner's Luck ... 59

BY WILLIAM MURDICK
AND WAYNE KOENIG

ON THE COVER:

Laser printers use laser beams as a part of their printing process. One could almost say they “write with light,” and artist Frank Mendeola illustrates this idea with simplicity and drama. Our feature article “Printing the Light Fantastic” offers an overview of laser printers – how they work and points to weigh when considering whether or not to purchase one.

Editors' Notes

If you've been tempted by the dropping prices of laser printers, don't succumb until you've read the overview in this issue by Robert Sawyer. In this article, Sawyer looks at the pros and cons (lasers are the only way to go for desktop publishing, for example, but for other purposes you might be better off sticking to your reliable old dot matrix) and offers some longevity statistics that may surprise you.

If you want to put together a mailing list, and you need more than a MailMerge but less than a full-fledged data base manager, you might want to consider a specialized mailing list manager. Joseph Comanda reviews five and comes up with two clear favorites.

The programming series continues with part 2 of Jerry Houston's article on BASIC. This month's article deals with programming fundamentals and the concepts of structured programming as they apply to BASIC.

The fear of frying is the subject of James Carucci's article on surge protectors. He tells you what steps you can take to guard your computer and peripherals against lightning and damaging power surges and offers step-by-step instructions for building your own surge protector.

If you receive the CP/M version of the magazine, look for James Spencer's article on creating a customized accounting system with Perfect Calc and for Richard Warner's discussion of artificial intelligence programming in CP/M.

In the DOS version, Roberta Moody offers a detailed guide for beginners on customizing WordStar with WINSTALL. Look also for reviews of Volkswriter Deluxe Plus Spelling, Smart Notes, and the Norton Commander.

By the way, we're pleased to announce that the MS-DOS version of *PROFILES* is now available in the Software, Etc. sections of about 100 outlets of B. Dalton Books nationwide. (The CP/M version is still available by subscription only.)

Terian Tyre
Diane Ingalls

About Profiles

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To direct *PROFILES* to a new address, attach a recent mailing label plus both your old and new addresses. Allow six to eight weeks for processing.

If you have questions or any other problem with your subscription or billing, please let us know at the Circulation address. We will answer the question or resolve the problem promptly.

International subscriptions are now available directly through *PROFILES* Magazine (only). Our regular international subscription rate is USD \$40 (including postage), which will entitle you to a one-year subscription (12 issues).

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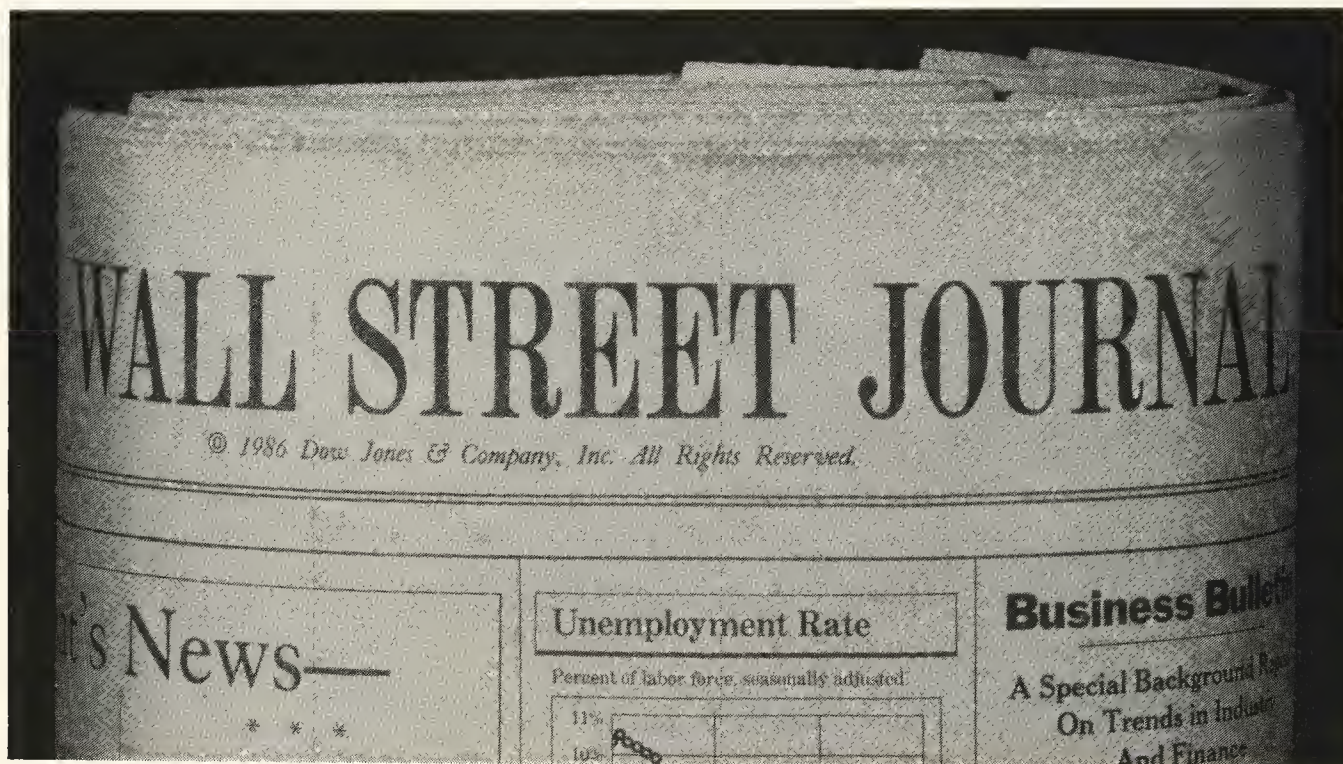
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Letters

Bug in the ^PS patch

Red alert! To those who, in response to Ted Silveira's article in the November 1986 *PROFILES*, dug around to locate the June 24 *PC Magazine* to get the ^PS patch for MS-DOS WordStar: STOP! I installed that patch and it has a big bug—it disables CorrectStar and hangs your system if you call MailMerge.

WSOVLY1.OVR contains code to work not only with WS.COM, but also with the other overlays. Despite the fact that the patch works flawlessly and as intended for ^PS, it has other very unfortunate properties. Quite a performance for one little byte!

It took me more than a week to run up against that bug—must have been a slow week at work. Meanwhile, I too had searched for and found the analogous CP/M patch for my home Kaypro and WordStar. This patch, the same one published by Silveira, seems harmless—MailMerge is okay, and I can access The Word Plus via "S" from the WS opening menu (because I have renamed TW.COM as SPELSTAR.OVR). MS-DOS and CP/M WordStar are not alike.

By the way, I want to be able to search for ^PY in text, so I didn't substitute 19 (^Y) for 13 (^S) in the patch I made. Instead, I substituted 0C (^L), because ^PL is not a meaningful WS command; hence, it's not something I'd ever search for.

Bernadette Freedman
Philadelphia, Pennsylvania

Ted Silveira replies that the ^PS patch for MS-DOS WordStar worked on his system without the bugs you describe. He suspects that the version of MS-DOS or WordStar you have may be affecting the patch.

He adds that he has discovered one other problem with the analogous patch in CP/M: it stops your from using the option to search for whole words (G) when using ^QA or ^QF.

Two issues: Pro . . .

Kudos to you again for a very fine December/January issue and also for going to the extra expense of publishing a CP/M version of your magazine for us "old-timers." You have definitely got my renewal for year four.

Keep up the excellent work.

Mike Mynsberge
Fresno, California

Splitting *PROFILES* into two magazines deserves kudos. If the present issue portends *PROFILES'* future, it augurs well. I read every article and column and enjoy them all.

Thanks again for your magazine—it's one of the few things we CP/M users have left.

Jeffrey Beard
Bowling Green, Kentucky

. . . and con

I just learned with dismay that you have switched to two separate publications, one for CP/M users and one for MS-DOS users. How about people like me who use both systems, one at home and one at the office?

I've been a loyal *PROFILES* subscriber since late '83 or early '84 and I feel jilted. I find your articles both interesting and important in my operation of my Kaypro machines. Is it now expected that I pay for two subscriptions so that I can learn about each system? Is there a special deal for owners of both systems? Please advise.

Robert G. Cheron
Port Washington, New York

I am extremely disappointed with the two-version (CP/M and MS-DOS) policy you've just announced.

I use both CP/M and MS-DOS equally (CP/M at home, and DOS at the office). I would bet that thousands of other *PROFILES* readers do likewise. Because of my satisfaction with *PROFILES'* coverage of both systems, I even declined to renew my subscription to *Personal Computing*. Now your new policy!

I request that you reconsider the wisdom of the two-version policy. I hope that it will be reversed.

Jim Derstine
Washington, D.C.

I am writing on behalf of the Kaypro Club of Austin, Texas, in response to your column in the November 1986 issue concerning the announcement of "two versions of the magazine . . . one for owners of CP/M machines and one for

MS-DOS owners."

In general, the feelings of club members is that this policy change is just another nail in the coffin of CP/M.

Many of our CP/M users (not just Kaypro owners) now either own or use DOS machines at home or work. Certainly as time goes on CP/M users will need to know more about the DOS system. Isolation of the CP/M users does not seem to be the answer.

Bob Coonrod
Austin, Texas

I have been a subscriber to *PROFILES* almost since its inception. The articles have been very useful and informative.

Now the first of the "split" issues has arrived. This was a few weeks after my renewal notice arrived. I have waited to see what you are doing before renewing, since I own both MS-DOS and CP/M machines. I don't like what I see.

I cannot justify two subscriptions, even though I might have need for them (how can I predict which form I will need this month?). Certainly there are many owners/subscribers who use both systems, and yet there are those of us who cannot get the Chiang review of the Borland programs or the tips from the *Conkeys*!

The bottom line is that I will have to let *PROFILES* go unless you resume a single issue format including all articles, not just those you think that I need.

D.A. Mathewes
Cullowhee, North Carolina

At home I use a Kaypro II. At the office we have IBM machines. If and when I upgrade at home I will likely buy a Kaypro PC or some Kaypro DOS version of my office system for the sake of compatibility.

I sure do hate to miss all the DOS articles simply because I get only the CP/M version of *PROFILES*. Is it so unusual to be a "dual system" person? I really do read almost all the articles on both systems.

Would it not be less expensive for your publisher simply to add a few more pages rather than to publish separate magazines for each system? If CP/M users ever drop below, say 1/3 of your subscribers, then we would expect the

coverage of CP/M to be reduced as well.

I would urge you to keep the format as it is and just expand the size of the magazine to give appropriate treatment to both systems.

Russ Bush
Fort Worth, Texas

I protest your decision to publish two different versions of *PROFILES*. All along it seems you have been working to maintain some continuity between the CP/M and MS-DOS folks and then all of a sudden we have to make a decision.

Like many of your long-time customers, I own two Kaypro computers. *PROFILES* is one of those rare magazines that consistently has valuable information for both of my machines. Unlike other magazines/professional journals I get, *PROFILES* is the one that I read every month.

It appears you may want to do some more market research on your customer profile. It seems very shortsighted to try to "split us apart" when many of us are both.

P. Vander Haeghen
Norwood, Massachusetts

It may be of value for all our readers for us to explain what the two "versions" of the magazine entail. Out of 72 pages in each version of the magazine, eight pages contain operating system-specific material. In the CP/M version, these eight pages contain two CP/M feature articles, and in the DOS version, there are two DOS features. The rest of the material in the magazine, excluding the table of contents, is exactly the same in both "versions." The version you receive, of course, depends on which operating system you have. If you're not getting the version you want, or for information on how to receive both versions, call or write to the *PROFILES* Circulation Department at P.O. Box 2889, Del Mar, CA 92014, (619) 481-4353.

Downloading with MITE

There are some statements that I must take issue with in your article, "The CompuServe Forum," in the November issue. Mike Craig and William Murdick stated that downloading binary files in MITE while the capture mode is on is

"an impossibility." I have called up CompuServe many times, and I do download binary files with MITE using Xmodem protocol, and I always turn on capture mode before I even start calling. That way I have a complete record of everything, should something go wrong.

Their suggestion that using eight data bits, etc., will produce garbage on the screen when you first log on makes no sense to me. Once again, I have never had that difficulty, and I have never logged on when I was not using eight data bits.

The sidebar also implied that MITE does not handle text uploads. My version does them quite nicely. In fact, I do all my writing off line, and then just upload text where I want it. I can compose notes to several people, and call up the various files where needed. This also obviates the need to concern myself with which editor a given forum is using. Both editors seem to take text as fast as my modem can send it. When in

doubt, reread it. It is all there, even if the upload seemed to add a few characters or break lines in funny places.

I am not married to MITE, but frankly, I have seen it mentioned in several periodicals over a couple of years, and it is always misrepresented in the reviews.

Michael Turner
Hamilton, Montana

On the question of conflict between Xmodem downloads and capture mode, you may have overlooked the point that the article did not say the person seeking help was using MITE. MITE does indeed allow Xmodem transfers while capture mode is active—other programs do not.

CompuServe states that its data format is seven data bits, even parity, and one stop bit (start bit is implied). That means CompuServe expects ten bits transmitted for each character. When Murdick logged on at eight data bits his system transmitted and expected to receive eleven bits—



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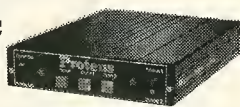
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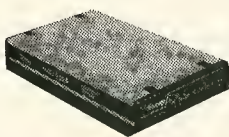


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Letters

so he got garbage.

If you log on with eight data bits but with no parity (which is probably what you have done), you may get away with it; This is because there is no parity bit transmitted — you have added a data bit and subtracted a parity bit, and CompuServe gets the ten bits it is expecting. But since you are using a data format other than the one that CompuServe recommends, CompuServe may not help you if the eight-bit format causes any trouble.

In the sidebar, it was noted that public domain programs are available that do an excellent job of uploading text files. There was no implication that MITE does not upload text files.

Traveling with your computer

We recently spent six months in Mexico and Spain and discovered that using foreign electricity to run U.S. computers isn't always easy; it was hard even to find out what and what not to do. This created much uncertainty for us, as we are both writers and have become so attached to our Kaypro 2X that we did not feel we could survive without a computer. We are sure it would be very helpful to users of all Kaypros — luggables and laptops — if you did an article on the subject of computers abroad.

My questions include:

1. Are there printers (preferably compact and light-weight, and not too expensive) that will run on both American and European current? Which ones? (Aside from thermal printers, which are not very satisfactory since both paper and ribbons are expensive.) Are there recommended transformers?

2. What do you have to do to operate a Kaypro in Europe?

3. What is the best thing to do about recharging laptop batteries with AC adapters?

4. Are there any other tips for travelers?

Any information you can give will certainly be appreciated by peripatetic readers.

Patricia Cumming and Lee Rudolph
Adamsville, Rhode Island

Look for the article you request in the June issue of PROFILES.

Wish list

Someone ought to come out with a Page Maker-type program for the Kaypro (to work with WordStar) fast. Just saw a demonstration of how it works with the Macintosh. Fantastic. I'll bet the Kaypro could do just as good a job at pagination, if it had the right program.

The future is "desktop publishing." I'd like to be able to do it with my Kaypro.

Also, can you have someone write an article telling us novices the basics on how to break into using modems to hook on these "boards," etc.? I suppose your feature, "Life at 300 Baud" is good for those who have been there, but it leaves the rest of us in the dark.

Floyd Hickok
Kenneth City, Florida

In response to your first comment, we must remind you that since Kaypro's product line includes DOS machines, Page Maker itself can be used on those models. What's currently available for CPM models was discussed in Ted Silveira's overview of desktop publishing in the December 1986/January 1987 issue. He will write more on desktop publishing in upcoming issues. (The term "pagination" literally means "the number and sequence" of pages; what you're referring to is "page composition" — a different thing.)

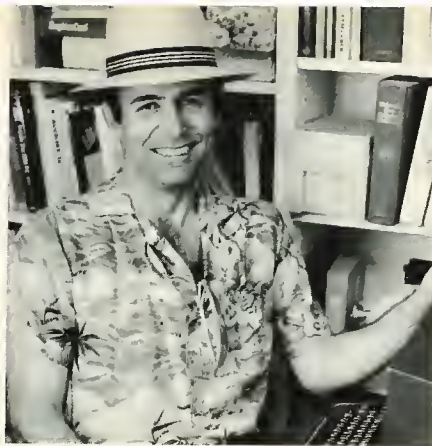
As for your second wish, it has already come true. For an introduction to telecommunications, see Marshall Moseley's article in next month's (April 1987) issue.

To renew or not to renew

I have just had occasion to sift through 1.5 years of accumulated PROFILES with an eye to deciding whether I should renew my subscription. As a result, I have finally achieved what I had previously requested: my WordStar comes up with the tab stops that I use. In addition, I can call up any type font that my printer will support, and use continuous underlining as well, and I'm probably not through yet!

Whereas I had previously felt that much of PROFILES was over my head and irrelevant (I'm not about to buy more software just to play with) I am convinced that some of your articles are for me. I am renewing today.

Ginny Walters
Ellicottville, New York



Flea Market

Public domain update

by Ted Silveira

In the MS-DOS world, WordStar doesn't hold the commanding position it does in the CP/M world. Instead, it's overshadowed by newer programs such as Word Perfect, Microsoft Word, and XyWrite III. WordStar is still widely used, and many people love it, but I don't think there's an MS-DOS WordStar user alive who hasn't longed for some of the flashy features other word processors have. And if WordStar users were able to add just one new feature to their old friend, I'd bet that 95 percent of them would ask for multiple windows. And if they got a second choice, I'd bet they'd ask for an un-do command. I have a pleasant surprise for you.

Galaxy is a shareware word processor, created by Omniverse of Renton, Washington. The shareware version, which you can find circulating on MS-DOS bulletin boards, is fully functional, and a registration fee of \$35 buys you unlimited phone support, more extensive printer drivers, and future updates.

Galaxy is not exactly like WordStar, but it's close. It uses almost all the familiar WordStar control commands, including the ^K commands, most of the ^Q commands, and the WordStar cursor diamond (except for ^W and ^Z, which inexplicably take you to the beginning and end of the file rather than scrolling the screen one line up or down).

Galaxy also has a second parallel set of commands for people who don't like WordStar commands. These use the F1 through F10 function keys and various ALT key combinations in a manner similar to many other MS-DOS programs (F1 for help, ALT-X for exit, CTRL-left arrow to move one word left, and so on).

And finally, Galaxy provides a third option for those who don't like either of the first two—all commands can be executed through a series of pull-down

menus at the top of the screen.

Galaxy lets you split the screen horizontally into two windows. Just as you'd expect, you can open a second file in the new window, jump between windows with a single command, and move blocks of text back and forth between windows. In fact, I'm using the split screen right now, working on this column in Galaxy's upper window while I keep Galaxy's documentation file (GAL-AXY.DOC) open in the lower window for reference.

you put a blank line between paragraphs), the tabs don't work at all.

Second, if you try to compensate for this by tapping the space bar five times to get your indent, it looks as if all is well . . . until you reformat the paragraph with ^B, at which time your five-space indent disappears! These first two quirks—together with the fact that Galaxy has an optional auto-indent mode that will automatically align the left margin of a line with the first letter on the line above it—make me think that

*Galaxy seems to work
as it should . . . it has
the commands to handle
most writing chores.*

Galaxy also has an un-do command so that you can recover from deletions you suddenly wish you hadn't made. How many WordStar users have wished for this feature after accidentally hitting ^Y (delete line) instead of ^T (delete word)?

I haven't given Galaxy a thorough testing, but so far it seems to work as it should, without major bugs, and it has the commands to handle the majority of writing chores. It does have some weak spots, however.

First of all, the tabs don't work as you'd expect. Instead of moving the cursor a fixed number of spaces, Galaxy tries to get smart and jumps the cursor over to a column even with the start of the next word on the line above. That may be fine if you're doing columns of numbers, but it's rotten if you're just trying to indent the first line of a paragraph a certain number of spaces. In addition, if the line above is blank (i.e.,

Galaxy started life as a programmer's text editor rather than as a writer's word processor.

Third, Galaxy's block marking commands will mark only whole lines, so you can't define a block that starts in the middle of one line and ends in the middle of the next. Instead, you have to mark all of both lines, which is seldom what you want when doing block moves or block deletes.

Fourth, Galaxy ignores WordStar dot commands and is weak in its advanced print formatting commands. It also doesn't seem to allow double-spacing (as far as I can tell) and lacks some other WordStar features as well. If you're a devoted WordStar user, you'll probably end up shipping your files back to WordStar for final formatting and printing. (Galaxy can read WordStar files, and WordStar will accept Galaxy files with some coaxing.)

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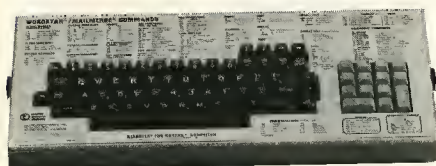
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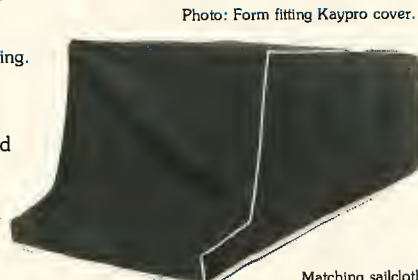


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Fifth, unlike WordStar, Galaxy holds the entire text file in memory at once, so you can't edit a file larger than your available memory. That's not a problem for many people, but if you have only 256K of memory, or if you're using lots of memory-resident programs like PolyWindows Desk, then you may find yourself cramped.

In summary, if you use many of WordStar's extra features, such as dot com-

mands for print formatting, you may not be happy with Galaxy. On the other hand, if you do fairly straightforward writing (articles like this one, for example), and you wish WordStar had windows, you'll probably like Galaxy.

Galaxy is available through major MS-DOS bulletin boards and user groups and on Kaypro's KUG ROS bulletin board at (619) 259-4437. It is also available for \$35 directly from Omniverse at P.O. Box 2974, Renton, Washington 98056-0961.

CP/M only

Lately, life in the world of CP/M public

can make life with your computer much simpler. But many people don't know that it's possible to redefine the Kaypro's keypad keys simply by using the CONFIG program that came with the computer.

The redefinitions that can be done with CONFIG are limited—on most Kaypros you can only assign a four-character string to each keypad key, but often that's enough. The real problem

with using CONFIG comes when you change from one program to another and want to change your keypad definitions, too. Normally, to change the current definitions, you must either run CONFIG again (awkward and time-consuming) or cold boot a disk containing a new set of definitions (also awkward and time-consuming).

The solution to this problem is AutoKeys, a program written by Gary Conway of Louisville, Kentucky. With AutoKeys, you can create a small (2K) program that will load a new set of keypad definitions and then run any program you want once the definitions

called DBKEYS.COM that would reset the keypad with your dBASE II key definitions and then run dBASE II.

By making it easy to create custom sets of key definitions, AutoKeys makes Kaypro's redefinable keypads more useful. And the penalty you pay in speed and space is very small—there's only a slight delay in running the main program, and only 2K of disk space is used for each set of key definitions.

AutoKeys will work with any Kaypro that uses CP/M 2.2F, 2.2G, 2.2H, or 2.2U. With versions F, G, and H, you can attach a string of up to four characters to each arrow key and keypad key. With version U, you can attach only one character to each arrow key but a string of up to nine characters to each keypad key. (With version U, CONFIG can attach a string of up to 80 characters to a keypad key, but unfortunately AutoKeys can't handle that many.)

The keypad changes made by the little program that AutoKeys creates are only temporary. They exist only in your Kaypro's memory and will disappear as soon as you load a new set of definitions or cold boot the computer (by pressing the reset button or by turning the computer off and then on again).

If you already use a key-definition program, you don't need AutoKeys. But if you don't, and you need sets of key definitions that are simple but varied, take a look at AutoKeys.

Patch&Go

I'm a great fan of ZCPR3, the very power-

You tell Patch&Go what program you want to patch and it asks for the address and the value.

domain software has been depressing. Very little new software has appeared in the last six months, and many public domain programmers have switched from CP/M to MS-DOS. Yet here and there you can still find some gems.

AutoKeys

Key-definition programs like XtraKey and SmartKey are wonderful things that

are loaded.

You can, for example, use AutoKeys to create a set of key definitions to use with WordStar and have them saved in the file WSKEYS.COM. Then when you run WSKEYS.COM, it will automatically redefine the keypad with your WordStar definitions and then run WordStar itself.

You could also create a second file

ful replacement for CP/M (see "The Z-System," PROFILES, December 1985, for a full review). One of ZCPR3's many powerful features is a trick called poke-and-go that lets you patch programs "on-the-fly." In ZCPR3's poke-and-go, you create an alias (a small program containing a series of commands, something like the programs AutoKeys creates) that will load a major program into your

computer's memory, patch the program that's in memory, and then run it.

You can, for example, create an alias that will load WordStar, patch it to set the margins and other defaults as you want, and then run the temporarily modified WordStar. The advantage of using this trick is that you can create many different versions of a program like WordStar without wasting disk space—each permanently patched copy

When you run WS-NON.COM with a command like **WS-NON TEST.ASM**, here's what happens: WS-NON loads WordStar's WS.COM into memory (without running it), changes the byte at address 0378h to FFh, and then runs the temporarily modified WordStar, opening up the file TEST.ASM in non-document mode.

The big advantage of Patch&Go, as with ZCPR3's poke-and-go, is that you

now appeared on the CP/M scene—the crunch and uncrunch system. I almost hate to mention this new system because the last thing CP/M needs is an alternative “standard” to confuse people, but crunching seems to be gaining in popularity, and crunched files are starting to show up on bulletin boards, so you'd better be ready.

The advantage of crunching is that it usually gives noticeably better file compression than squeezing, something that may not be too important to the average user but can be a great help if you have to store a lot of archive files or if you run a big bulletin board system. You can recognize a crunched file because it will have a Z as the second letter of its file type—the crunched version of TEST.DOC will be TEST.DZC.

The necessary crunching utilities are available in CRUNCH20.LBR, which contains programs for crunching and uncrunching files and for viewing crunched files. (CRUNCH20.LBR is a library file, a number of smaller files grouped together into one larger one, so you will need one of the library utilities—DE-LBR, NULU, or LU—to extract the individual programs from CRUNCH20.LBR.)

AutoKeys, CRUNCH20, and Patch&Go are all available through Kaypro's KUG ROS bulletin board at (619) 259-4437. You can also find them on most major CP/M bulletin boards and through many user groups.

A new file compression system has appeared on the CP/M scene—the crunch and uncrunch system.

of WS.COM takes up 18K, but each alias requires only 2K.

Until now, you could only use poke-and-go if you had installed ZCPR3 on your computer, but John Osnes of Albany, California, has created a program he calls Patch&Go, which brings the magic of poke-and-go to ordinary CP/M. Patch&Go is copyrighted but released free for non-commercial use.

When you run Patch&Go, you tell it what program you want to patch. Then it asks for the address you want to patch and the value you want to insert there (both the addresses and the values must be hexadecimal numbers). When you've inserted one patch, Patch&Go asks for the next—as far as I know, there's no limit to the number of patches you can make. When you're done, Patch&Go doesn't actually patch the program you specified; instead it creates a small alias program that contains the patching instructions.

Suppose, for example, that you want to create an alias that will cause WordStar to start up in non-document mode instead of document mode. You tell Patch&Go that you want to create an alias called WS-NON.COM that will patch WS.COM (WordStar's main program) by inserting the value FFh at address 0378h (that's the patch to cause WordStar to default to non-document mode), and Patch&Go will create WS-NON.COM according to your specifications.

never permanently alter your WordStar file, and each alias requires only 2K.

You can do very extensive patches with this method, changing margins, page offset, line spacing, word wrap, and a host of other things. You could even install a different printer on-the-fly, using one alias for a letter-quality printer and another for a dot-matrix printer. Nor are you limited to patching WordStar—you can use Patch&Go on any program that you find amenable to patching.

And don't miss the possibilities of combining Patch&Go with AutoKeys. It's perfectly possible to create an AutoKeys alias that will stuff your WordStar keypad definitions into memory and then run a Patch&Go alias, which in turn will load WordStar, patch it, and run it. With such combinations, you can have your computer completely reconfigured every time you run a new program.

Crunch and uncrunch

Many people are familiar with SQ.COM and USQ.COM, the squeeze and unsqueeze utilities that can compress files, particularly text files, so that they take up less space and then restore them to normal again. Bulletin boards routinely squeeze the files they have available for downloading in order to save space, and NewSweep, CP/M's most popular file maintenance utility, has the squeeze and unsqueeze functions built in.

A new system of file compression has





Life at 300 Baud

The electronic city

by Brock N. Meeks

In Cleveland, doctors make house calls—so do dentists, lawyers, and even veterinarians. But instead of reaching for a little black bag and hailing a cab, they boot a communications disk and fire up a modem.

Free-Net, an online computer system, puts several of Cleveland's community services within reach of anyone with a modem. Free-Net is the nation's first free, open-access community computer system to offer professional information to this extent.

Free-Net (216/368-3888, 300/1200 baud, 24 hrs/day) is located on the campus of Case Western Reserve University (CWRU). The mandate of Free-Net is to serve as a community "free clinic," dispensing all types of advice, including medical information, to the Cleveland metropolitan area. (However, anyone can use the service, regardless of location.)

Corporate donations made Free-Net a

St. Silicon

"In the fall of 1984, several medical clinics around Cleveland decided they needed to exchange information among themselves—without always having to call a meeting," said Dr. Thomas Grundner, assistant professor of family medicine at CWRU and Free-Net's sysop. "They decided that a bulletin board system would meet the need, so I set up a simple system for them on a 48K Apple computer with software I wrote myself."

The system set up by Grundner was an immediate success. It allowed the clinics to pass information to each other, post general-interest messages, and keep abreast of the latest medical news. The system worked so well that soon news of it reached the general public. The results were surprising.

"All of a sudden we had people coming on and leaving medical questions in the open message section," Grundner

not intended to be: a public forum for the dispensing of medical information."

Grundner then developed a BBS designed to specifically handle a question-and-answer information exchange. He christened the new system "St. Silicon Hospital and Information Dispensary."

This public system, which was covered in an article in *The New England Journal of Medicine* (April 10, 1986) reached its saturation point within three weeks. Because the heavy usage outran the system's capability, St. Silicon went looking for larger quarters—a bigger computer.

An endowment from AT&T allowed Grundner to turn St. Silicon into the multi-user Free-Net system.

Free-Net opens

In July 1986, Free-Net was officially put online with pomp and circumstance. "Both Governor (Richard) Celeste and

Free-Net emulates the city it serves; it offers the services you'd find in an actual city.

reality. Free-Net's primary benefactor is AT&T, which donated over \$50,000 in computer hardware to start the system.

The software was custom designed to handle a question-and-answer forum. The program, written in C, runs under the UNIX operating system. Taking advantage of UNIX's multi-user capability, Free-Net can handle up to 15 callers simultaneously. Its "message administrator" is a hefty 44-megabyte hard disk.

But Free-Net did not start out so well-heeled.

said. Had these questions gone unanswered, public use would have dropped off; but the questions didn't go unanswered.

"The doctors using the system began providing answers to those questions, and then we couldn't keep the public away," recalls Grundner. "As a medical educator, I was interested in this fascinating exchange of medical information to the public. In a sense these people were benignly crashing my system and turning it into something it was

Mayor (George) Voinovich were at the ceremony," said Grundner. "They cut the ribbon, shook hands, and kissed 2.5 babies; Free-Net was online."

The entire system is set up to emulate the city it serves; it's an electronic city, of sorts, complete with the kinds of services you'd find in an actual city. The Post Office handles electronic mail; The Schoolhouse serves as an online PTA meeting in which users ask administrators of Cleveland public schools questions about curriculum and make

suggestions for improvements.

The Courthouse offers information on Ohio law for the layperson, and there's also a lawyers' library and a question-and-answer forum on legislation. The Legal Clinic operates much like St. Silicon, though it's not as diversified and compartmentalized. Lawyers answer all types of legal questions in a general forum.

In the University Circle section, users have access to CWRU officials and the curators of the Cleveland Museum of Natural History. Another feature is Government House, where users can contact elected officials at the local, state, and federal levels. There's also a Public Square that includes, among other things, a "free speech" podium, where users can air their gripes by submitting electronic essays.

St. Silicon thrives

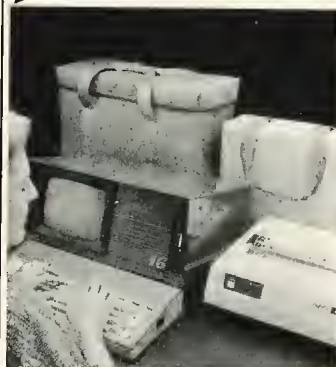
The hospital section is the most extensive. When users first enter the hospital (still known as "St. Silicon"), they go to the "information desk," where they can search each of the hospital's message bases, called "question banks." Users can browse or search by specific topic.

They can also stop in at any of the associated medical clinics: family medicine, dental, handicap center, health enhancement center (which deals with fitness), sports medicine clinic (for the weekend athlete), alcohol and drug abuse information center, nursing and home care office, staff lounge (for the continuing education of medical professionals), and the hospital library.

Each of these sections has a question bank where users can leave medical questions. Medical conditions of all types, from sexual dysfunction to cystic fibrosis, are covered. In addition, there is a small information file on each of the different sections that provides an over-

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February '87

- Electronic mail services
- BASIC tutorial, part 1

300 BAUD

view of the services offered in that particular section.

"Although AT&T made it possible to set up the hardware part of the system," said Grundner, "it's the Cleveland community that makes the system work."

All sections of the system are moderated by individuals and organizations in the Cleveland area, and all are volunteers. The medical professionals participating on the system are all board certified in their respective fields; legal assistance is supplied through the CWRU law school.

Expanding the access

Critics of Free-Net contended that the system locked out those with no access to a computer and modem. Such critics claimed that for a system to be of value to the entire community, the computer "have nots" should somehow be allowed access, as well.

As this issue of *PROFILES* was being prepared, Grundner was answering such critics by explaining that Free-Net was at 80 percent of its operational power and that expansion of the system was planned for mid-winter. This expansion was expected to provide public computer terminals, in libraries, that would have access to Free-Net. There were plans to put terminals around the CWRU campus and maybe even in shopping malls.

Grundner sees a parallel between the rise of the free public library movement in the last century and the rise of a free public computing movement in this century.

"By the mid-1800s literacy had gotten high enough, and the cost of books cheap enough, that there was tremendous pressure for free public access to that information," he said. "We're seeing something similar happening now. As computer literacy gets higher, and the cost of computing equipment drops, more people will have access to a computer system and will be looking for a system like Free-Net. I think you'll see these types of systems spreading all over the country."

Free-Net is the prototype of a regional network that could sweep into several metropolitan areas. To ensure that the intent and spirit of Free-Net is spread to other cities, Grundner has set up a cloning process.

"We're making the software for Free-

Net available to qualified medical groups," Grundner says, speaking in italics. "We want to make sure the software doesn't get into the hands of a teenager who decides to run a bogus medical system." The software is available for a license fee of \$1 per year. Grundner also notes that the original St. Silicon software (the Apple-based version) is available to similarly qualified groups for a flat fee of \$5.

Checking in with the doctor

Although access to the system is free, there are, in effect, two categories of users. Anyone may dial in as a "visitor" and read the messages, or visit any of the various online clinics. However, only registered users can place messages on the system.

To register, simply download the registration form (in the administration section) and send it in. In a few weeks your personal ID and password arrive in the mail. Registration is free. You should note, however, that the system carries some disclaimers.

Simply logging on to the system, either as a guest or registered user, you automatically agree not to hold Free-Net liable should any damage arise from following the advice received from the system's doctors. Grundner explained that doctors and lawyers are instructed to provide suggestions and general information; doctors do not diagnose or offer treatment information. In addition, users reading the questions and answers (all exchanges are open for public perusal) are presented with the following caveat: "The information contained on this system is not intended to supplant individual professional consultation, but is offered as a community education service. Advice on individual problems should be obtained directly from a professional."

Checkout time

"This system is something people have been talking about for 20 years," Grundner said. "We kept saying that someday you would be able to use a home computer to contact your kid's school, get medical information, send electronic mail to your neighbor, contact your senator, and so on. I'm glad to report that this is one futuristic 'someday' that has finally arrived."

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A complete payroll system supplied with current tax routines for every state. Multiple pay rates, multiple overtime rates, multiple other pay rates, eight user deductions (each can be an amount, a rate or %), deductions may be taken before or after taxes. Commissions, tips, tips considered as wages, earned income credit, SUI, SDI, etc. are all included. In short it's a very comprehensive payroll system but one which is very easy to use. Its functions include Employee File Maintenance; Employee Lists in multiple levels of detail; Input Worksheets; Time Card Entry; Regular, Overtime, Other, Commissions, Tips, Misc. Pay. Exception Processing is the rule so you need only enter variable data. Manual checks are processed quickly and easily. Weekly, Bi-Weekly, Semi-Monthly, Monthly pay cycles (run individually or combined); Departmental Payrolls; Checks; Check Registers; Deduction Registers; Earnings Reports; 941's; W-2's; Unemployment Reports; Multi-state; Manual Checks; G/L interface for Federal, FICA, State and Local Taxes, Federal/State Add-Ons, FICA, FUTA, SUI, SDI, EIC, 8 user deductions. CAPACITIES - 600/2000 emp. (CP/M/MS-DOS), 98 Tax File Rcds.

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Improve your cash management with this fine system. You'll get the up to date accurate picture of accounts to be paid, cash requirements for the data on file. Payments and notes vouchered automatically insuring timely payments. Complete check writing included. The system reports include Vendor File Lists, Open Vouchers, Ageing By Due Date, Discount Date Ageing, Cash Requirements, Check Registers, G/L Transaction List, Query Vendor Status, Credit Vouchers, Deleted Vouchers. CAPACITIES of 600 Vendors, (CP/M), 2000 Vendors (MS-DOS) - no limit on transactions.

HARDWARE REQUIREMENTS

CP/M: 64K (53K TPA) & CP/M 2.0 or higher.
MS-DOS: 128K (or more) & MS-DOS/PC-DOS 2.0 or higher - ANSI.SYS.
Printer: 132 columns (compressed pitch supported), continuous forms.
Disk/s: Dual Floppies/Hard Disk/Both - 191K recommended, less works.
CRT: 80/24 with Clear, Home, Clear to EOL, Up, Down, Left, Right.

**CURRENT
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NEW A/R SYSTEM FOR CP/M AND MS-DOS USERS NOW SHIPPING. NEW FEATURES INCLUDE 4 LINE NAME AND ADDRESS, FINANCE CHARGES, VARIABLE AGEING, DESCRIPTIVE BILLING, ASCII OUTPUT FILES, MULTI-CLIENT PROCESSING. MANY NEW REPORTS, ITEM INVOICE FORMATS, SERVICE INVOICE FORMATS, STATEMENT FORMATS, ETC. FOR PLAIN PAPER AND MANY POPULAR PRE-PRINTED FORMS. TAXABLE AND NON-TAXABLE ITEMS ON SAME INVOICE. FLASH REPORTING TO SCREEN OR PRINTER; MORE...



First Impressions

A speedy dot matrix and Infocom's newest game

by Tom Enright

The products we'll look at this month are a fast, heavy-duty dot-matrix printer from Okidata and an interesting new interactive fiction game from Infocom. The dot-matrix printer is Okidata's Microline 294 with a claimed print speed of 400 characters per second. The interactive fiction game is "Leather Goddesses of Phobos," which is billed as a 1930s "space opera" with a dash of sex.

Okidata Microline 294

At a time when everyone is raving about laser printers, why should you consider dot matrix? The answer is cost and dependability. Laser printers are expensive—\$2,000 and up—and are not built for heavy use. Most laser printers come with paper-feed trays that hold about 100 to 250 sheets of paper as a built-in limitation on use, and they are not

printer you could buy two fast dot-matrix printers.

The dot matrix I looked at was the Okidata Microline 294. It is a wide-carriage printer that uses black or color ribbons and comes with one "personality module."

The personality module is a plug-in cartridge that contains a serial or parallel interface and hardware logic for the printer's command set. The personality module on our test printer was "IBM parallel"—that is, it uses the IBM 5152 graphics printer command set and comes with an 18K (upgradeable to 32K) buffer as standard equipment.

The printer itself is 21.4 inches wide, 13 inches deep, and six inches high and weighs 16.5 pounds. It runs from normal 120 volt AC power and feeds paper from either the back or from the bottom. The 294 is rated at 400 cps in draft mode and 100 cps in correspondence mode. It

You then press the "select" button to change a setting, "form feed" to go to the next item, "line feed" to go back to the previous item, or "TOF" to exit the menu. Your selections are maintained and are effective each time the printer is turned on.

Two disks come with the IBM-compatible version of the Okidata 294. One is a font editor and font download program and the other is a color screen dump utility. Since most Okidata printers have the capability of accepting downloaded character fonts, Okidata includes a font editor with several fonts already defined with each printer. In addition, there are built-in selections for British, German, French, Swedish, Danish, Norwegian, Dutch, Italian, French-Canadian, and Spanish characters.

The color screen dump program lets you duplicate a screen of color graphics

Okidata's manuals are among the best in the industry—they're for users, not programmers.

designed to print for much more than an hour per day. Their much-vaunted print speed is for repeatedly printing the same page, not for printing single copies of many different pages.

With a good dot-matrix printer, you simply attach a box of paper (3,000 sheets) to it and make sure the ribbon is reasonably fresh. If your dot matrix breaks down, it is much less expensive to repair. The majority of printing tasks don't call for the quality of a laser printer. And for the cost of one laser

moves the printhead at 600 cps across horizontal white space, form feeds at about 3-1/2 inches per second, and it does a line feed in 100 milliseconds when set at six lines per inch.

Instead of setting the default print parameters with dip switches, the Okidata 294 (like the 292 and 293) uses a set-up menu run from the printer's front panel. When you press the correct sequence of buttons, a menu of default choices for print mode, interface, and character set are printed on the paper.

on the printer. You can change the size of the printed image by specifying the horizontal or vertical space to be used on the printed page. It also allows mapping screen colors to some other color when printed. The color ribbon has four bands (black, blue, red, and yellow) and you can do some color mixing to produce up to 14 colors on a page. Only seven colors can be chosen from the screen dump menu; the rest must be selected by software commands.

Graphics on the Microline 294 are

compatible with the IBM 5152 printer graphics, Epson printers, and the IBM ProPrinter. There are three graphics modes. They print in 72 x 72 dots per inch, 144 x 72 dpi, and 288 x 72 dpi. Any graphics image from your screen can be sent to the printer with the screen dump utility. Alternatively, you can run GRAPHICS.COM (an included DOS utility) before generating the graphics image and print it with the PrtSc key.

In my performance test, using 8-1/2 x 11-inch paper, the print speed in draft mode on the Microline 294 averaged between 213 and 246 characters per second. The test consisted of printing a three-page letter with 50 lines of 64 characters and a left margin of eight characters. The Okidata printed this letter in 49 seconds. As a point of reference, the same series of timed tests were run on the popular Gemini-10X. The Gemini averaged from 67 to 103 cps and took two minutes and 22 seconds to print the test letter.

Keep in mind that no printer runs at the speed its manufacturer advertises. The speeds they quote are only for the portion of a line printed after the print head has accelerated to maximum speed. My tests measure overall throughput for various types of typical output—several pages worth for each of the tests. If I had run the tests on 14-inch wide paper, the printer would have registered higher speeds. But since most owners print on 8-1/2 x 11-inch paper, my tests were run on that size paper.

Okidata's manuals are among the best in the industry. They are written for users, not professional programmers. They have extensive tutorials, usually in BASIC, on accessing all functions available on your printer.

The Okidata 294 is a little too expensive for the average personal computer owner—it seems to be intended more for

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the business or commercial market. If you need a heavy-duty dot-matrix printer, one that you simply feed paper and ribbons, then this printer may be just what you need.

Leather Goddesses of Phobos

"Leather Goddesses of Phobos" is one of the latest adventure-type games from Infocom. It comes with a 3-D "Flash Gordon" style comic book to give you

YELLOW BOOK, THE SMALL KNIFE, AND THE ROPE, THEN BURN THE ORANGE BOOK" is entirely legal.

"Leather Goddesses" starts out in a bar in Upper Sandusky, Ohio, in the year 1936. The first thing you notice is that you have an urge to answer the "call of nature." Whether you enter the men's room or the ladies' room at this point determines whether you play the rest of the game as a male or a female.

the game. Part of the reason is that in the two weeks I've had the game I've managed to accumulate a grand total of 40 out of 417 possible points. The other reason is that I have no intention of telling anyone how to solve the game. That would be like giving away the plot of a murder mystery. Solve it yourself! Every hint you need is either in the documentation or should already be known to a reasonably educated adult.

*The time required to
finish is one reason
"Leather Goddesses" has
SAVE and RESTORE commands.*

the background on the story (yes, 3-D glasses come with the game). Also included is a "scratch-and-sniff" card that may or may not include hints for playing the game.

The basic premise of the game is that the Leather Goddesses from Phobos (a moon of mars) are getting ready to invade earth. They plan to use Earth's population as "love slaves" for their entertainment. (Before some wiseacre asks, "So who wants to stop them?" let me say that foiling their plan is the central purpose of the game.)

For those of you who don't know about adventure games or interactive fiction, a little background is in order. These games don't have graphics, just text. Playing them is like reading a book and being able to direct the actions of the main character. The goal is to solve some mystery and earn a certain number of points. You earn points by solving puzzles and obtaining objects. Some of the objects are needed to get other objects or to gain entry to certain places. The games are designed so that you cannot earn enough points to finish the game without solving the central puzzle.

What distinguishes Infocom interactive fiction games from others is the sophistication of their command line parser. Other games limit you to two- or three-word commands. Infocom games allow nouns, verbs, adverbs, and adjectives. A command like "TAKE THE


The game also has three levels of naughtiness (Tame, Suggestive, and Lewd), which roughly correspond to G, PG and R movie ratings. Even the R-rated level is pretty inoffensive. I would not object to my 19-year-old daughter or 15-year-old son playing this game at any level they chose.

The majority of the game, at least to the point to which I've managed to progress in two weeks, is vintage Infocom. Prior games have included puzzles that a knowledge of classical literature, ancient history, or Greek mythology would help in solving. And that brings up another point about Infocom games. You don't solve them quickly. It can take several months of free-time play to even come close to finishing the game.

The amount of time required to finish is one reason the game has SAVE and RESTORE commands. You can SAVE your current position and score to a disk file (with whatever name you choose) and RESTORE it later on. It's a good idea to save your position often, because it's easy to do something that could get your character killed. If you haven't saved your position and you get killed, you have to start all over. If you do something that destroys an object you need later in the game—tough. Being able to save your position lets you experiment with different actions without permanent loss of points.

You may have noticed that I'm not giving a lot of detailed hints on solving

If you get hooked on the game and want to play on your lunch hour, you can—Infocom no longer copy protects its software. You can make as many copies of the disk as you wish and they all will work correctly.

The documentation, however, is another story. Infocom has always made key parts of the documentation difficult or impossible to copy on a Xerox machine. Sometimes key facts have a low contrast with the background. Other times a map is printed on shiny metallicized paper. In the case of "Leather Goddesses," can you imagine trying to Xerox a 3-D comic book? It just won't work—the results are useless. Infocom should be congratulated for coming up with the only form of copy protection that I approve of. 

Quick Reference Summary

Product: Microline 294
Manufacturer: Okidata Corporation
532 Fellowship Road
Mt. Laurel, NJ 08054
Phone: (800) OKIDATA
Sugg. List Price: \$1,394

Product: Leather Goddesses of Phobos
(DOS)
Manufacturer: Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
Phone: (617) 576-3190
Sugg. List Price: \$39.95



PRINTING THE LIGHT FANTASTIC

Will the laser printer replace the daisywheel?

by Robert J. Sawyer

Have you made funeral arrangements for your daisywheel printer? No one likes to think about these things until it's too late, but let's face it: the daisywheel's days are numbered, and it's the laser printer that's hastening its demise.

What makes a laser printer better than a daisywheel? Speed, for one thing. Most daisies chug along at 10 to 40 characters per second. Lasers can print eight pages a minute.

Lasers are also quieter. Even with a daisywheel printer stuffed inside a sound enclosure, you still have to put up with 75-decibel hammering. Most lasers hum along at 55 decibels, which, to human ears, seems only one-fourth as loud.

Lasers can do some neat tricks with paper handling. Using software, you can choose to print along either the paper's short or long dimensions. The former method is called "portrait mode," the latter, "landscape," after the usual orientations of painters' canvases. A few lasers can even print on both sides of a piece of paper in a process called "duplexing." Laser printers can also print on acetate, making them great for preparing transparencies for overhead projectors.

Most important, though, lasers make it easy to mix different styles and sizes of letter-quality type. They also let you combine text and graphics on the same page—and at a resolution far better than that of the best dot-matrix printer.

Does that mean you should be digging a grave for your dot matrix as well? I don't think so. The old nine-pin workhorses are still more economical to operate than laser printers. They're also capable of higher volumes. Many lasers have recommended daily maximums of just 100 pages (often enforced by providing paper supply trays that hold only that many sheets). At eight pages a minute, that means a laser supposedly should take a nap after less than a quarter-hour of operation.

We tend to think of laser printers as the new kids on the block, but they've been around since 1975. Even desktop units aren't a recent innovation: Canon introduced one called the LBP-10 in 1979.

What is new is the low price. The LBP-10 cost \$30,000. Ever since the Hewlett Packard LaserJet was introduced in 1984, laser printers have been available for under \$5,000. One model, the QMS Kiss, now costs less than \$2,000, and it's a safe bet that there will be a \$1,500 laser printer by year's end.

Businesses (and even some home users) are snapping laser printers up at these prices. Dataquest, Inc., a market research firm in San Jose, California, predicts that \$4 billion worth of laser printers will be sold in the United States and Canada in 1987.

The technology

Like most inexpensive laser printers, the LaserJet, Apple's LaserWriter, and the Kiss are based on Canon's LBP-CX laser print engine. The LBP (for Laser Beam Printer) is a spinoff from Canon's successful personal photocopier line.

Each LBP-CX laser printer contains a rotating drum that has a uniform positive charge of static electricity. The drum is photosensitive: It gives up its charge at any point exposed to light. A semiconductor laser beam scans the drum, flashing on and off. Whenever it winks on, a dot of zero charge is left on the drum. Under the control of the printer's microprocessor (often a Motorola 68000), the dots trace out the image to be printed.

The rest is identical to photocopying. Toner, a positively charged, finely ground plastic powder, is brushed onto the drum. Since like charges repel, the toner only sticks where the drum isn't still positively charged, filling in the zero-charge dots left by the laser. Opposite charges attract, so rolling negatively charged paper over the drum is all it takes to transfer the image. The paper is then drawn through rollers heated to 400 degrees Fahrenheit. They melt the toner, fusing it to the paper.

Competitors for Canon's print engine have appeared from several vendors, including Hitachi, Konica, Mita, Toshiba, and Xerox. The leader among the newcomers, though, is the Ricoh LP4080. Besides its own printers, the Ricoh engine is

found in machines from AST Research, Burroughs, Digital Equipment Corporation, Epson, Oasys, Okidata, Quadram, and Texas Instruments.

Instead of a rotating drum, the Ricoh engine uses a light-sensitive belt. A laser clears out areas to be left white instead of marking spots to be made black. The Ricoh engine has a life expectancy of 600,000 pages, which is six times the Canon's. It stacks printouts the right way around, with page one facing down on the bottom of the pile. The Canon reverses the order, so you have to manually re-shuffle the pages.

Many MS-DOS programs support laser printers, but New-Word 2 is the only major CP/M word processor to do so. Although a laser-compatible WordStar update (finally!) has been promised for early 1987, I doubt that MicroPro will offer a CP/M version.

Programs that don't support lasers directly usually do sup-

other laser printers. Ironically, Hewlett Packard's own Laser-Jets don't support HPGL.

Although you can buy color toner (in blue, brown, green or red), there are no multi-color laser printers yet. The inability to print more than one color at a time or to use paper larger than 8-1/2 x 14 inches means that, even with HPGL, a laser is no substitute for a plotter.

Desktop publishing

A top-of-the-line dot-matrix printer lays down 120 dots per inch. Most lasers cram 300 dots in the same space. This is still far fewer than typesetting, which uses as many as 2,400 dots per inch.

Surprisingly, it's a low-tech problem that keeps laser printers from offering greater resolution. Toner can only be ground so fine without it vaporizing when you heat it. It's possible for

*To print a full page of
graphics at 300 dots per
inch requires about a
megabyte of memory.*

port either the most popular dot-matrix printers, the Epson FX series, or the most popular daisywheel, the Diablo 630. Many laser printers can emulate these standards. Hewlett Packard LaserJets, though, do not, so many programs also provide a special LaserJet driver. This has become a standard unto itself, and some laser printers offer LaserJet emulation.

Graphics

If your dot-matrix printer can print one square inch of high-resolution graphics, then it can also do a full page at the same level of detail. That's because dot-matrix printers rely on your computer's random-access memory (RAM) or disk drives to contain the complete document. They go blithely along, dealing with output in byte-sized chunks.

Not so the laser printer: it uses its own memory to prepare an entire page at a time. Although most lasers are rated at 300 dots-per-inch (dpi) resolution, many can't do a full page of graphics at that level of detail. A Hewlett Packard LaserJet, with a scant 128 kilobytes of memory, can only print 1/16th of a page at 300 dpi. Even the LaserJet Plus with 512K can only do a half page at that resolution.

To print a full page at 300 dpi requires the printer to have about a megabyte of memory. However, a page of complex graphics may take as much as 15 minutes to print. If your needs are primarily word processing, you can save money and buy a text-oriented laser printer with as little as 59K. Many allow you to add additional RAM later if your needs change.

Some laser printers understand the Hewlett Packard Graphics Language. HPGL is a simple but powerful set of standard commands used by most plotters and supported by most computer-aided design (CAD) packages. It controls labeling, character set selection, axes placement, and so on. Systems conversant in HPGL, such as the AST TurboLaser, can produce complex charts in less than one-fourth the time it takes most

modern lasers to pick off 600 or more dots in a single inch, but the current toner particles are too big to allow that much resolution. It's a pity, because with 400 or 600 dpi, lasers could do a credible job of printing half-tone photographs.

A Hewlett Packard brochure boasts that "the result [of laser printing] is a page that looks like it was typeset and professionally printed." Yes and no. It does look professionally printed; in fact, it looks just like a high-quality photocopy. But typeset? Laser printing is to typesetting what "near-letter-quality" dot-matrix printing is to daisywheel printing. The output looks great until you lay it next to a page of the real thing. People are beginning to bandy about the term "near-typeset quality" for laser printing.

Laser printing has given rise to a new industry: desktop publishing. When I first learned programming, I used a keypunch to encode data on IBM 80-column cards (if you think those are display adapters that go in expansion slots, you're much too young to have a computer). The cards were shipped off to another building to be processed by a mainframe computer. If I made any mistakes, I wouldn't find out until I got the output the next day.

Desktop publishing does for the layout artist what desktop computing did for the programmer. It gives him or her rapid feedback on works in progress. No more waiting days for copy from a typesetting firm, only to have to send it out again for corrections. With a laser printer, layout and design can be done in-house, potentially saving money. Text and graphics can be easily integrated. Newsletters, flyers and brochures are a breeze.

That said, remember that a desktop publishing system will no more make you a great layout artist than using WordStar will make you a great writer. Apple is one of the few vendors to admit this. Its LaserWriter Plus manual contains a useful chapter on layout and design, along with a bibliography of

related works.

With a laser printer, you will have no trouble producing sharp-looking text-only documents such as correspondence or manuals. If you want to produce something with integrated text and graphics, though, make sure there's money for a design consultant in your budget.

A glossy magazine like *PROFILES* wouldn't be visually appealing if it were laser printed. But for small-circulation applications, 300 dots per inch may be enough. Some local newspapers are switching to laser printing from typesetting. Since ink bleeds on newsprint anyway, the difference in resolution is hardly noticeable.

As I mentioned earlier, laser printers allow typefaces to be easily combined on the same page. This should be done with restraint, since the reader's brain must reorient each time a different typeface is encountered. Anyone who's endured reading a letter from a new Macintosh owner is familiar with typeface overload.

Laser printers usually come with one or more fonts (complete character sets of one typeface) built into read-only memory (ROM). Some, like the HP LaserJet, can take additional fonts on plug-in cartridges that look like 8-track cassettes. Others, including Cordata's LP-300 series, can download fonts from your computer's disk drives. Many can use either method. Disk-based fonts are slower to load but generally cost less.

Typefaces are protected by copyright and typesetters pay royalties for their use. Some laser-printer manufacturers save money by making up their own typefaces. Others come with "real" typefaces, licensed from their owners. The Apple LaserWriter Plus, for instance, includes these printing industry standards in its ROM repertoire: Avant Garde, Bookman and Zapf Chancery (from the International Typeface Corporation), and Helvetica, New Century Schoolbook and Palatino (from Linotype's Mergenthaler Library). Many third-party companies sell add-on fonts for laser printers. When considering typefaces, quality is more important than quantity.

Page composition programs

Most laser printers will faithfully follow the simple formatting instructions your word processor can give. If your design needs are more complex, you may want to invest in a page composition program—software that lets you manipulate text and graphics on your computer's screen.

Such programs take WYSIWYG (what-you-see-is-what-you-get) to a new level, letting you see different typefaces and complex layouts exactly as they will be printed. The best-known page composition program is PageMaker from Aldus Corporation. (Paul Brainerd, co-founder of Aldus, coined the term "desktop publishing" in 1984.) PageMaker earned its reputation on Macintosh computers but is now also available for MS-DOS systems.

Other page composition programs include ClickArt Personal Publisher from Software Publishing, Fontasy from Pro-Soft, FrontPage from Studio Software, MagnaType from Magna Computer Systems, The Newsroom from Springboard Software, PagePerfect from Beyond Words, and Ventura Publisher from Xerox. MicroPro has a WordStar-compatible page composer in the works.

Many page composition programs come with libraries of clip art: Attention-getting line drawings, cartoons, and

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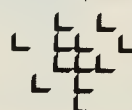


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I think page-composition programs are a stopgap solution. They will slowly disappear as their features are incorporated into standard word processing software. Microsoft Word and XyWrite already contain some page-composition features, and WordPerfect Corporation has announced that release 5.0 of its flagship word processor will have some as well.

Page description languages

A few laser printers support a more sophisticated approach to controlling layout: page description languages. These enhance your software's formatting capabilities, providing typesetting-like programming commands to size and rotate characters and graphics, set type in circles, slant, stretch or compress characters, print multiple columns, and so on. They also contain algorithms to smooth out jagged edges when printing graphics. Page description languages are usually burned into the printer's ROM. Having such sophisticated proprietary software built in can add \$5,000 to the price.

The best-known page description language is PostScript from Adobe Systems. The QMS PS 800 Plus and the Apple LaserWriter are PostScript machines.

A division of QMS, Inc., sells a \$2,995 PostScript expansion card called the PS Jet that works with Canon-based printers. This board gives these machines the same 13 fonts that come standard with the LaserWriter, plus 2.5 megabytes of RAM,

which is enough for the most intricate page design. Right now, only Microsoft Word and a handful of other MS-DOS programs support PostScript, but that should change dramatically in the next year.

Two other popular page description languages are Interpress from Xerox and Document Description Language (DDL) from Imagen. Hewlett Packard raised many eyebrows when it chose DDL instead of the better-known PostScript for its LaserJets. It also surprised people by offering DDL as a \$2,500 expansion card that goes inside an MS-DOS computer, rather than as a hardware enhancement for the printer itself. A page description language is only important if you plan to use your laser printer to generate complex formats.

Do you need a laser?

Is a laser printer right for you? If you spend your days with Lotus 1-2-3 or SuperCalc, you probably use Sideways or Twist & Shout to print continuous spreadsheets over many pages. Although lasers do beautiful horizontal spreadsheets (using the printer's landscape mode), they spit them out on pre-cut paper. To make a large spreadsheet requires (shudder) manual cutting and pasting.

If merge-printed letters are your mainstay, think twice before buying a laser. Laser printouts look like photocopies instead of hand-typed originals, defeating the purpose of personalizing form letters. Letterheads printed with thermography (raised plastic printing) can create problems, too: the heat of the

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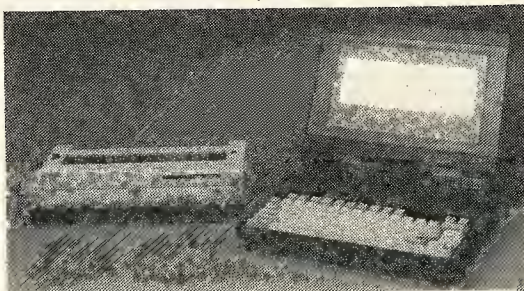
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Lasers aren't cut out for data processing, either. Although most claim to print eight pages a minute, that rate is usually only achieved when producing multiple copies of the same page. If each page is different, speed can be cut in half, making a laser no faster than a brisk dot matrix.

Consider all of the costs before buying a laser printer.

Consider all of the costs before buying a laser. Lasers are sometimes justified as multi-user devices, but it may be more efficient to give each of ten workers his or her own \$500 dot-matrix printer rather than make them all share one \$5,000 laser.

An impact printer can keep squeezing ink out of a \$5 ribbon until the cows come home. Laser printers require regular transfusions of toner. In addition, the photosensitive drums or belts have to be replaced periodically.

For Canon-based printers, toner comes in neat sealed cartridges similar to those used in Canon personal copiers.

However, because the toner cartridge also contains the photosensitive drum, this method forces you to replace both at the same time. It's like having to throw out your shoes because your socks have developed holes.

For Ricoh engines, you pour toner into an open bin, which can be messy. Toner should be added every 3,000 pages for the Canon, but you can print twice as many on a Ricoh before running out. The Ricoh photosensitive belt should be replaced in a separate operation every 10,000 pages.

Ricoh toner lists for \$84 a tub and a new belt will set you back \$199. A fresh Canon cartridge goes for \$115. That means a Canon-based printer uses up 3.83 cents a page in consumables, while the Ricoh costs 3.39 cents a page. Add to those prices the cost of paper (one or two cents), plus amortization of the capital investment (five cents a page for a \$5,000 printer with a rated life of 100,000 pages).

Most laser printers come with a starter kit, including toner and paper, but a few (including the QMS Kiss and the Canon LBP-8 series) don't. Laser printers offer many capabilities, but at a premium price. Of course, that price will come down.

Still, make sure there's some room left in your printer burial plot. As personal computing continues to evolve, the laser printer will doubtless be succeeded by something else. ■

Robert J. Sawyer is a freelance writer and broadcaster in Toronto, Canada. His article on patching WordStar, "Do It Your Way," appeared in the July 1986 PROFILES.

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Mailing List Managers

*Not too big and not too small —
these programs are “just right”*

by Joseph Comanda and Lucien Kress

You've probably seen the ads for those cheap (under \$100) mailing list managers. The price sounds suspiciously low, and you wonder whether they can be any good. Well, some are, some aren't, and some, surprisingly, are very good. In this article we'll take a close look at five mailing list managers that regularly advertise in **PROFILES**.

As a group, these little programs are an interesting breed. They fill a void in the software market. The “mailmerge” features of most word processors are good for producing form letters, but they're poor at managing mailing lists. Data base programs handle mailing lists well, but they're expensive and can't be used straight out of the box. The programs discussed in this article come already set up to manage a mailing list.

The publishers of these products usually amount to a programmer or two and maybe someone who answers the phone. The products themselves fall somewhere between the amateurish efforts of do-it-yourself programmers and the professional creations of the megabuck software giants. Generally, they're professional programs designed and packaged on a shoestring budget.

There's a lot of variety among these programs, and each has its own personality, but we can talk about some basic features they all should have.

1. They should be easy to set up, simple to use, and come with reasonably good instructions.
2. They should have all the standard name-and-address fields plus a few extras that a user can adapt for special needs.
3. They should allow the user to enter names and addresses, look them up, make changes to them, and delete them.

4. They should be able to produce labels and form letters (or at least have a provision for exporting lists in formats that popular word processors with mailmerge capabilities can handle).

5. They should be able to sort a mailing list in a number of different ways (for example, alphabetically by last name or in zip code order).

6. They should allow the user to select records for specific mailings using a number of criteria (e.g., all lawyers interested in sports equipment whose zip codes start with 19).

Most of the programs discussed offer most of these basics. Some go beyond, providing extras like user-definable fields, duplication detection, master list printouts, test labels (for aligning your printer), multiple copies of labels (several labels per name), and the ability to transfer files to and from other programs.

Now that you have an idea of what this type of software should be able to do, and what some of the bells and whistles could be, let's take a closer look at some specific packages.

FastPak Mail (CP/M and DOS)

FastPak Mail is an attractive system. It comes packaged in a well-designed cardboard case and has the most organized and professional manual of all the programs we reviewed. A money-back guarantee and a year of free telephone support and upgrades make FastPak Mail a safe buy. The manufacturer, DHA Systems & Software, also publishes several programs that augment FastPak Mail, including a range of accounting and text-editing programs.

FastPak Mail is powerful. It allows an unlimited number of data files with up to 9,000 records each. Besides having its own versatile “mailmerge” (i.e., form letter generation) capabilities, it can transfer data to and from other programs in MailMerge's comma-delimited format.

Data entry is straightforward and includes an autocopy feature that optionally repeats information from the previous record. Besides the basic name and address fields, only two



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extra fields are provided: a memo field for comments and a reference code field.

You can look up records by name, zip code, reference code, or record number. Searches can be done by specifying an exact match (e.g., the last name must equal "Matthew"), a pattern (all last names that start with "M"), or a range (all zip codes between 20000 and 30000). The same technique can be used to create sublists for selected mailings.

FastPak Mail is especially good for designing forms, form letters, and labels. It uses its own merge codes that you can enter with virtually any word processor. The merge codes include formatting features that allow you to do things like omit blank lines in addresses, break the phone number into

FastPak Mail is quick, powerful, and easy to use.

three sections, and include the current date. You can also insert codes that stop the merging process to allow user entry at strategic places. Labels can be printed in any format from one to four across horizontally, and the program generates test labels and multiple copies of labels.

Other special features include plenty of online help; a report that lists possible duplicates; a two-step deletion process in which you first mark a record for deletion and then condense the file to finalize the process; and a set of DOS utilities accessible from FastPak Mail's main menu that include DIR, COPY, ERASE, RENAME, TYPE, and PRINT. The CP/M version comes with a "new user" utility that allows the program to be installed for any terminal, and the program will run on virtually any CP/M machine.

In summary, FastPak Mail is quick, powerful, and easy to use. Its only real limitation is a shortage of user-definable fields.

PRO Mail (CP/M and DOS)

PRO Mail, from Hurd Computer Systems, is a simple system. It's short on fancy features but handles the basics well enough. It lets you add and look up names (either by record number or last name), print labels in a variety of sizes and formats (from one to four across), and produce MailMerge format files for generating personalized form letters with WordStar.

It comes with an installation program that allows CP/M users, in particular, to customize the program for their terminals. It will also ask, during the first installation, if you have a printer capable of 132 characters per inch.

After installation you're ready to begin. From the program's main menu, there are three basic choices: File Maintenance, which leads to options like adding, changing, and deleting records from a list; File Operations, which leads to options like backup/recovery and duplicate removal; and Reports and Labels, which offers a variety of list and label formatting options.

PRO Mail assigns record numbers automatically and offers

one spare field, a 50-character comment field. It allows, optionally, a full or partial autocopy feature when you're adding records. When you're looking up records by last name, you can find a name even if you only type in the first few letters.

PRO Mail's sort option lets you keep your list in any order you'd like. You can then print out lists and labels in alphabetical order by name, in zip code order, or in the sort order you selected for that list. You can also print lists and labels for selected groups on your mailing list, but you can only select on one field.

Since PRO Mail lets you maintain several lists, it also offers an option for merging two lists into one. It would be nice if it also allowed you to split a list into two or at least create a new list from a subset of an existing list, but unfortunately, it does not.

PRO Mail also has a backup and recovery feature, but inexplicably it puts the backup on the same drive as the list itself. This renders the feature useless for larger lists on floppies.

While PRO Mail seems to do its job adequately, we found it somewhat sluggish in saving records to disk, even on a hard disk. Consequently, we'd be reluctant to use it for a very large list. It also has a tendency to bail out on you if you do the wrong thing. For example, we tried to look up a record using a record number that didn't exist in the file. Instead of letting us try again, it bounced us out of the program. Fortunately, this doesn't seem to corrupt data, but it's a poor way to handle errors.

Promailer Mailing System (CP/M and DOS)

At first we were unimpressed with Promailer, primarily because of its manual, but this soon gave way to a more positive view. Though its documentation is not fancy, it is satisfactory, and online help is also available. The program itself combines a very simple menu and data-entry system with good report and label generation.

In Promailer, data-entry, maintenance, and searching all involve an easy, fill-in-the-form approach with WordStar-like commands for cursor movement and editing. It provides two miscellaneous fields (Field 1 and Field 2) and a comments field.

You may select groups of records for reports or mailings (or to create sublists) by specifying any combination of exact or partial field matches or ranges. To change or delete a record you have to know its record number. You can obtain that either by printing a master list or by looking up a specific record and noting its number.

Promailer can print labels one, two, or three across, but cannot print test or multiple copies. It can't generate form letters, but does allow you to transfer files (both in and out) in MailMerge format. Unfortunately, this procedure requires some know-how since it is not well documented.

Special features include a "Type" program that allows line-by-line editing and printing, an option to check whether a name already exists on the list during data entry, and the ability to print envelopes with return and mailing addresses.

Promailer is from Woodsmith Software and is a good mailing list program. It is not particularly flexible, but could be suitable for someone who needs a simple system. The WordStar-style commands may be an added attraction.

Maillist (CP/M and DOS)

Maillist stores up to 2,000 records per file (900 under CP/M) with no limit on the number of files. It lets you generate customized reports and labels, but not form letters. The publisher, Micro Art Programmers, offers a ten-day refund policy, 18 months of free telephone support, and an inexpensive upgrade program.

Even though it's fairly easy to use, we considered Maillist to be the least satisfactory of the programs we reviewed. Its main problem is its slow screen prompts. At any given moment only one piece of information is displayed on the screen, so between entries and prompts, the user must sit through an annoyingly slow scrolling process. Moreover, the programmers seem to presume a basic uncertainty on the user's part and request double or triple confirmation of every entry or choice.

For example, when you're adding names, Maillist prompts you, line by line, for each piece of information and eventually lets you confirm or reject the entire record. Similarly, changing a record requires updating one line of information at a time.

Maillist offers only two extra fields: a customer identification (id) field and a customer type field. One interesting feature is a built-in check of the zip code against the state, preventing careless mistakes. To change or delete a record, you can search by any one field.

*PRO Mail's sort option
lets you keep your list
in any order you'd like.*

Maillist can print labels up to three across, but won't print test labels or multiple copies of the same label. It also has a special custom report option for printing master lists and sublists in any format and allows sorts by any single field.

Maillist cannot generate forms other than labels, and it does not have any documented procedure for transferring data into formats that other programs can use. However, its data is stored in SDF format (fixed-length ASCII), so although the manual doesn't tell you how, a knowledgeable person could, with some manipulation, get data out of it.

Maillist is generally inflexible and infuriatingly slow to use, but the processing speed itself is average. We could recommend this program for someone whose first concern was ease of use and who did not require any advanced features other than data file printouts and labels. Any other user would quickly outgrow Maillist.

dNAMES III (DOS)

dNAMES III is by far the most powerful and flexible of the MS-DOS products. Purchasers get two versions of the program: a compiled version that runs on its own, and a source code version that requires dBASE III or III PLUS to run but allows those with a bent for programming to customize dNAMES III to their hearts' content.

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Either way, users will find dNAMES III to be a very sophisticated mailing list program with a simple, attractive menu and data-entry system and a wealth of special features.

dNAMES III has 13 user-definable fields: three text fields, three number fields, three money fields, three comments fields, and a classification field. There is also space for two phone numbers and a salutation field.

The user may look up and change or delete a specific record by record number, by full or partial last name, or by scrolling through the file. It is even possible to delete a group of records

buying anything other than FastPak Mail or dNAMES III.

Between FastPak Mail and dNAMES III, it's a tough choice (except for CP/M users). Their developers took different approaches. FastPak Mail's programmer strove for simplicity and ease of use above all else, while dNAMES III's programmer has been willing to sacrifice simplicity in an effort to respond to user requests for more features with each new release. Both approaches are valid, but they make for quite different products.

FastPak Mail will meet most users' needs. It's the ideal

dNAMES III is by far the most powerful and flexible of the MS-DOS products.

that match a given condition.

dNAMES III also lets the user create sublists by entering a group of selection criteria using any combination of exactly or partially defined fields and logical arguments (and/or). These criteria can also be stored for repeated use.

dNAMES III allows printouts of lists and sublists to be sorted by any two fields and prints labels in any imaginable format with any number of repetitions. It also prints test labels for alignment, imports and exports data in MailMerge format, and can import data directly from dBASE III.

And that's not all: A set-up program allows you to set printer codes, monitor colors, and program defaults. For example, you can specify that lists be kept automatically sorted by last name or that certain repetitive fields be filled in automatically. The reports available include a list of possible duplicates and a count of records by zip code. A special process allows you to define classification codes, which are subsequently interpreted in report printouts.


The only weakness we found was a manual that was rather cursory at some points. The sophistication of this program makes it less easy to use than the other MS-DOS programs, though the menu system and data-entry forms simplify the processing enormously.

Inexperienced users may have some difficulty with a complicated search or with a task like importing dBASE III files into dNAMES III format, but for the business or individual needing lots of information for each record and willing to spend the time required to learn the system, dNAMES III receives our highest recommendation.

Some final thoughts

We came away from our review with some clear favorites. In terms of features, FastPak Mail and dNAMES III were superior in almost every respect to the other products we looked at. In addition, they both performed fast enough to convince us that they could handle larger files without significant loss of speed.

The other products were all viable, but they were either not very exciting or lacked flexibility at one point or another. Given that they all cost about the same, it's hard to justify

product for people who don't like to tinker and just want the program to work. dNAMES III is for the tinkerers who like to have control over everything from the screen color to the length of the last name field. 

Joseph Comando and Lucien Kress are both data base trainers and consultants for Small Systems Consulting, Inc.

Quick Reference Summary

Product: dNAMES III v. 1.2 (DOS)
Manufacturer: Data Based Solutions, Inc.
 1975 Fifth Avenue, Suite 105
 San Diego, CA 92101
Phone: (800) 833-2700; in CA: (800) 336-6060
Sugg. List Price: \$49

Product: FastPak Mail v. 2.0 (CP/M & DOS)
Manufacturer: DHA Systems & Software
 832 Jury Court
 San Jose, CA 95112
Phone: (408) 947-1011; orders (800) FASTPAK
Sugg. List Price: \$79.95 plus \$5.00 S & H

Product: Maillist (CP/M & DOS)
Manufacturer: Micro-Art Programmers
 614 Alameda Padre Serra
 Santa Barbara, CA 93103
Phone: (805) 962-0922
Sugg. List Price: \$89

Product: PRO Mail (CP/M & DOS)
Manufacturer: Hurd Computer Systems
 6330 Lincoln Avenue
 Cypress, CA 90630
Phone: (714) 220-2729
Sugg. List Price: \$49.95

Product: PROMAIL III (CP/M & DOS)
Manufacturer: Woodsmith Software
 Route 3 Box 550A
 Nashville, IN 47448
Phone: (812) 988-2137
Sugg. List Price: \$89.95

Artificial Intelligence Programming Languages

A thoughtful look at what's available for CP/M

by Richard Warner

Okay, so CP/M isn't the fastest and sexiest operating system you can run on a micro any more. But it's a long way from being obsolete. It still supports word processing, spreadsheets, programming in languages from BASIC to C, telecommunications—you know, all of the jobs you probably bought your 8-bit CP/M machine for in the first place.

But how about the fancy stuff: expert systems, natural language interfaces, everything that computer buffs call "artificial intelligence"?

The fact is, you're not left out in the cold. You can do most everything on your 8-bit CP/M computer because the two most popular programming languages developed for such applications—LISP and PROLOG—will run on your machine.

Symbolic programming languages

Artificial Intelligence merely means getting your computer to "think" like a human being. LISP and PROLOG are of special interest to people doing AI because they are symbolic programming languages. Though all programming languages use symbols, the conventional languages (C, Pascal, etc.) are intended for arithmetical operations. The symbols they manipulate most comfortably are numbers. So they're best either at simple number crunching or at jobs that can be fairly easily expressed in arithmetic terms.

Most AI applications, however, can't be expressed conveniently in such terms because the kinds of information they manipulate are much more word-like than numeric. To deal with this need, true symbolic programming languages like LISP and PROLOG allow the programmer to define symbols and build them into other, more conceptually complex expressions, which can themselves be manipulated. This results in formal systems that come much closer to the richness and expressive power of a natural, human language like English.

The fact is that you can write programs that do AI-like things with any programming language, including C, BASIC, Pascal, or even Assembler. (After all, from the computer's point of view the world consists of zeros and ones, regardless of whether the language is AI or not.) Nevertheless, languages designed for AI applications allow you to write word-oriented programs much more easily.

But the richness and power of symbolic languages have a price: to anyone used to conventional languages, they look pretty weird. LISP and PROLOG aren't inherently any more difficult than other programming languages, but they are different, and these differences take some getting used to.

*Artificial intelligence
merely means getting your
computer to "think" like
a human being.*

An example

Let me illustrate this by describing the structure of a very simple program as it could be written in a conventional language like C and then contrasting it with a comparable program in the symbolic language LISP. Both programs will compute the arithmetic average, or mean, of an indeterminately long series of numbers. To do this in C, you would proceed as follows:

1. Declare the variable types you would need for the computation. We'll use four: COUNTER, INPUT, SUM, and AVERAGE.
2. Set COUNTER and SUM to '0'.
3. Increment the value of COUNTER by '1'.
4. Read the first INPUT number and add it to SUM.
5. Repeat steps 3 and 4 until an end-of-file is input.
6. Divide the value of SUM by the value of COUNTER and place the result in AVERAGE.
7. Print AVERAGE.

The comparable program in LISP would look like this:

1. Define a recursive function (*SUM (L)*) to return the sum of all the elements in any list *L*. This function removes the first element from the list and adds it to zero. It then removes the second and adds it to the resulting total, then the third, and so forth until all elements have been added. (Most implementations of LISP will already include this function.)

2. Define a function (*LENGTH* (*L*)) to count the number of items in the same list. (This function is also part of the standard library.)

3. Define a function (*AVERAGE* (*L*)), which will:

- ask for a list of numbers;
- define the value of the element average as the value of (*SUM* (*L*)) over (*LENGTH* (*L*));
- print the value of average.

Note that LISP doesn't need to declare variables. Also note that it doesn't work on individual numbers, but on lists of numbers. Finally, instead of calling the operations to be performed, it simply defines the desired value as the value of a function, which can in turn be defined as the values of other functions.

A PROLOG version of this program would use the same general strategy as the LISP version, since each defines values in terms of functions, which can in turn be defined in terms of other functions. Even at the level of pseudocode, however, the PROLOG version would show many differences of detail from LISP. To name just one, PROLOG isn't limited to operations on lists. Let's take a closer look at each of these languages.

LISP

LISP ("LISt Processor Language") is the best known and most widely used of the AI programming languages—at least in the United States. It was developed around 1960 by John McCarthy at M.I.T., making it one of the oldest high-level programming languages around. It was designed to allow the programmer to define and manipulate lists. As we've already seen, LISP programs are functions that define lists of objects and then operate on them. This doesn't sound too impressive until you recall that the lists operated on can themselves be programs.

Once you get used to the fact that LISP doesn't work like conventional programming languages, it isn't a particularly hard language to work with. For one thing, most versions of LISP are interactive, which makes them easier to write and debug. For another, LISP has a relatively simple syntax as programming languages go. It only has two variable types: simple expressions called *atoms* and complex expressions called *lists*, which are made up of atoms and other lists.

Also, while in conventional programming languages the functions and data are formally very different from each other, LISP uses the same list structure for both the functions and the data the functions apply to. In addition to making LISP easier to work with, this means that LISP functions can include each other just as easily as they can include data; in fact, the same LISP function can call itself. This ability of LISP functions to call themselves is called *recursivity*, and it is one reason why LISP is so powerful for symbol manipulation.

LISP could be called the BASIC of AI languages: it's the AI language that almost everybody started with. And, like BASIC, LISP comes in lots of different flavors—INTERLISP, Franz LISP, MACLISP, Common LISP. Each has its own subtle differences from the others. This can lead to problems with portability. But these problems simply reflect the popularity of the language, and until everyone agrees on a standard version, people wanting to do LISP programming will just have to live with them. (Ironically, at least two of the major dialects were introduced in order to provide a standard version. Oh, well . . .)

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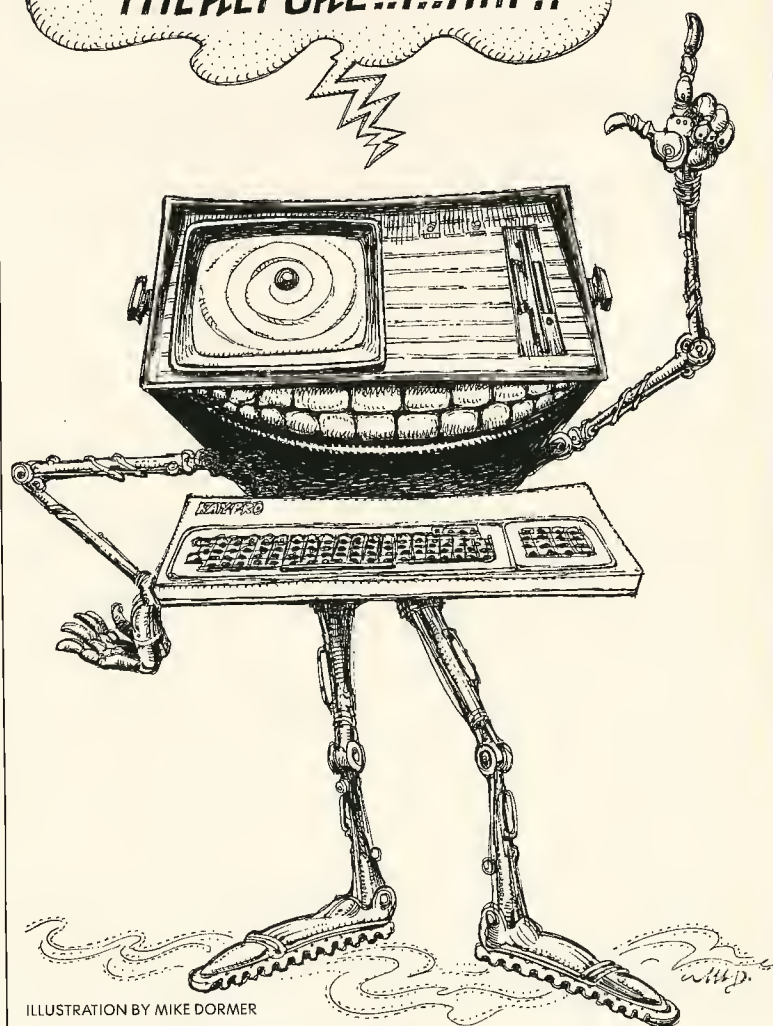


ILLUSTRATION BY MIKE DORMER

LISP implementations on CP/M

A number of implementations of LISP run on CP/M. The four I'll describe span a wide range in power—and in price, from two virtually free public domain implementations to a very complete \$150 version.

The good news is that you can get two public domain LISP interpreters on a single disk for just \$12. The bad news is that they are both very limited versions of LISP, and that to get either of them to work right, you need to have the right kind of compiler. (I apparently don't.)

The first, XLISP, comes in a compiled version that lets you do the most basic list manipulation operations of LISP and virtually nothing else (it will give you some feeling for the language, however). But it also comes in the form of C source code, including header files and a library of LISP functions that should allow you to write some interesting programs. It also includes documentation that is about as good as you're likely to find for public domain software. Unfortunately, it is written for the AZTEC-C compiler, and, as written, it won't compile with any other version of C that runs on CP/M. This leaves you with two alternatives. If you already have the AZTEC-C compiler, you can customize the header files to suit your machine (the documentation tells you how), fire up the compiler, and let it rip. Or, if you have some other C compiler

and happen to be a C programming wizard, you can hack away at the source code and see what happens.

The second program, LISP.PAS, appears to be a version of LISP 1.5—McCarthy's original dialect. It describes itself as "the essence of a LISP interpreter," and that about covers it; it consists of a single program that includes file I/O, garbage collection, and a bit more than the bare bones of LISP. It comes in the form of Pascal source code (the code is well commented, but there is no other documentation). I couldn't get the code to compile on my (public domain) Pascal compiler, so I can't say much about this implementation's performance. Again, it might be fun to play with this if you've got the technical expertise.

LISP/80 is a commercial offering. An implementation of the INTERLISP dialect, it's a much more useful piece of software. Not just a LISP interpreter, LISP/80 also provides its own neat little programming environment: an expression-oriented editor, a file librarian, debugging tools such as a break mode and trace facility, and a "Pretty Print" routine that allows you to print the functions you write in more readable form. LISP/80 also supports file I/O, so you can build your own library routines. In short, it allows you to do just about everything you'd want to do, including calling your own machine language functions.

The distribution disk for LISP/80 includes two demonstration programs, which are fun to play with and also will give you some idea of how to build a primitive natural language interface, and a program that seems to "learn" from its mistakes. The documentation for this software includes a decent reference manual and a brief introduction to LISP. (Wisely, the authors didn't try to rewrite the standard LISP texts, one of which you should probably get anyway.)

LISP/80 is a nice package with an attractive price—\$39.95. Its only real drawback is its speed—if you want to build a large expert system, for example, you might consider a package like the following.

At the high end of the price scale—\$150—is SuperSoft LISP, a very full implementation of LISP 1.5 as McCarthy originally developed it. It has roughly the same features as LISP/80, but with a number of advantages. For one thing, the error reporting, although somewhat cryptic, is more complete. And it has a more powerful editor. But its biggest advantage is its greater speed.

This greater speed is due partly to the fact that the interpreter is written in fast machine code and partly to the fact that only the more frequently used functions are included in the interpreter. One minor drawback of this, of course, is that your notion of the more useful functions may not agree with SuperSoft's (mine didn't!). But since the other functions are included in the library and can be loaded when you need them, this isn't very serious.

The documentation assumes a fairly good understanding of LISP.

PROLOG

A few years ago, PROLOG ("PROgramming in LOGic") was almost unknown (the authoritative *Handbook of Artificial Intelligence*, compiled in 1982, gives it only a short paragraph). But PROLOG has been around for a while—it was developed by Phillipe Roussel of the Artificial Intelligence Group at the

For Further Information

Programming in PROLOG (2nd ed.) by W.F. Clocksin and C.S. Mellish. Springer-Verlag, 1985. \$17.95.

—An update of the standard PROLOG reference.

Expert Systems: AI in Business by Paul Harmon and David King. Wiley Press, 1985. \$16.95.

—A non-technical survey of the capabilities and effectiveness of expert systems currently in use in the corporate world.

Artificial Intelligence: The Very Idea by John Haugeland. MIT Press, 1985. \$14.95.

—A very solid and readable summary of the basic issues, written by a respected authority in the field. If you want a good foundation for learning more, this is a very good place to start.

Mind Design: Philosophy, Psychology, Artificial Intelligence by John Haugeland, Ed. MIT Press, 1981. \$10.

—A collection of representative articles by people actually doing AI work, selected for both significance and accessibility.

Artificial Intelligence by Elaine Rich. McGraw-Hill, 1983. \$26.95.

—A text aimed at graduate students. Don't start with this one unless you already have a good grounding in computer science.

The Binary Brain: AI in the Age of Electronics by David Richie. Little, Brown, 1984. \$14.95.

—Decent (but fairly light) introduction to some of the key concepts of AI. Some readers will find his vision of future trends unappealing.

Programmer's Guide to LISP by Ken Tracton. Tab Books, 1980. \$10.25.

—A dialect-neutral summary of the language, aimed at the experienced programmer.

LISPcraft by Robert Wilensky. Norton & Company, 1984. \$21.95.

—A tutorial, based on the Franz LISP dialect.

LISP by P. H. Winston and B. K. P. Horn. Addison-Wesley, 1981. \$18.95.

—The standard text for LISP. Very thorough, can be used by someone working alone, and assumes no background in programming. Unfortunately for us CP/M users, the exercises are based on the MACLISP dialect, which doesn't run on CP/M. However, an appendix compares this dialect with INTERLISP, of which LISP/80 is one version.

University of Marseilles in 1972. And in the past few years it has been coming up so fast that many AI software developers consider it the wave of the future.

There are two reasons for the increasing interest in PROLOG. The first is that the Japanese are using this language for their "Fifth Generation" research and development program. This has forced almost everyone working in AI in the United States to at least take a second look at PROLOG. The second is that, although PROLOG is a less flexible language than LISP, it does some things much better. Most importantly, it allows the programmer to define relationships between objects and then use these relationships, or predicates, to build and then modify its own data bases. This makes it very useful for writing expert systems, which are (at least for the moment) the most commercially important AI applications.

The Japanese are using PROLOG for their "Fifth Generation" research and development program.

As far as I know, there is only one commercial version of PROLOG that runs on CP/M: micro-PROLOG, \$99 from Programming Logic Systems. As you might expect, micro-PROLOG comes with a self-contained programming environment, including its own editor, a "trace" facility, error trapping, and other debugging tools.

Micro-PROLOG has some other nice features, too. It provides an extremely high-level front end called SIMPLE that allows a relatively naive user to begin constructing a customized expert system within a few minutes after backing up and loading the program. It also allows the user to define the control program (or "supervisor") that runs the micro-PROLOG interpreter.

In addition, micro-PROLOG uses disk-based virtual memory, wherein the available RAM is expanded, but anything beyond 64 kilobytes is stored on disk and switched in and out of memory as needed. This may slow things down, but it helps avoid the workspace limitations of PROLOG, micro-PROLOG supports standard implementations of PROLOG, micro-PROLOG supports floating point numbers, which means you can use it for computations like division. (Without floating point, all you can do is integer division.)

But there were some things about this implementation that I didn't like. One of them is the core syntax of micro-PROLOG, misleadingly called the "standard" syntax. PROLOG has a standard syntax—that developed by Clocksin and Mellish. By that standard, micro-PROLOG is very odd indeed. As its developers point out, its syntax is more like LISP 1.5 than like other versions of PROLOG. They argue that this syntax is more useful on micros than the conventional variety. Since they have a version that does in fact run on my Kaypro and no one else's does, I am inclined to believe them. Nevertheless, this non-standard syntax is a real drawback if you are interested in

learning to program in PROLOG with the aim of using your knowledge on larger systems.

Less serious in the long run, perhaps (although more immediately annoying), is micro-PROLOG's documentation. The reference manual is well-organized and contains lots of low-level detail. The syntax for example, is very well defined. But I didn't find the manual as useful at a higher level—as in "What is this module really good for?"—since (as they noted) the writers assumed the reader already knew a fair amount about logic programming. For users who don't, the software is packaged with Clark and McCabe's text/tutorial *micro-PROLOG: Programming in Logic*, that was written specifically for this implementation. That helped. But there were still some areas that I felt could have been covered better, such as the use of the supervisors.

Summary

I hope this survey has given you some idea of the AI programming possibilities open to the CP/M operator. If you'd like to pursue the topics raised in this article in greater depth, there are dozens of books that might help. (I've listed a few that I have found helpful; you might also check out the AI-related books reviewed by Dick Lutz in the December 1985 *PROFILES*.) No programming language is easy, and nothing you can build on a CP/M machine is going to run as fast, or do as much, as something built on one of the big machines. Nevertheless, you can do some interesting things with these languages, an 8-bit CP/M computer, and a reasonable investment in time and effort. Enjoy!

Richard Warner has a Ph.D. in Theoretical Linguistics. He works at AT&T Communications as a contractor in software development.

Quick Reference Summary

Product: XLISP.C, LISP.PAS
Available From: Canada Remote Systems Ltd.
 4198 Dundas Street West, Suite 311
 Islington, Ontario M8X 1Y6
Phone: (416) 231-2383
Sugg. List Price: \$12

Product: LISP/80
Manufacturer: Software Toolworks
 1 Toolworks Plaza
 13557 Ventura Boulevard
 Sherman Oaks CA 91423
Phone: (818) 907-6789
Sugg. List Price: \$39.95

Product: SuperSoft LISP, v. 3.83
Manufacturer: SuperSoft
 P.O. Box 1628
 Champagne IL 61820
Phone: (217) 359-2112
Sugg. List Price: \$150

Product: micro-PROLOG, v. 3.1
Manufacturer: Programming Logic Systems, Inc.
 31 Crescent Drive
 Milford CT 06460
Phone: (203) 877-7988
Sugg. List Price: \$99

Making Perfect Calc Count

Linking spreadsheets to create an accounting system

by James Spencer

Take a look at any computer magazine and you will see numerous advertisements for accounting packages. For those of us lucky enough to get Perfect Calc bundled with our Kaypros, purchasing accounting software is unnecessary. With Perfect Calc you can design individualized spreadsheets that act as accounting programs. Because you design them, they fit your special needs and do exactly and only what you wish.

This article will demonstrate how to construct three separate spreadsheets to help with your accounting. In addition, it will show you how to associate these spreadsheets so that the data generated by one spreadsheet is used by another. This gives you the ability to create a powerful accounting system. I will assume that you have read the introductory piece on Perfect Calc in the December 1986/January 1987 *PROFILES* and are familiar with entering formulas and replicating them.

First of all, for those with no experience or education in bookkeeping, don't let the word "accounting" bother you. The program we will set up requires absolutely no prior knowledge of accounting. You will be required to determine just one thing—whether an entry is an expense or income.

The project

For illustrative purposes I will go through the steps of setting up record keeping for a Babe Ruth Baseball League. The accounts I will deal with for this organization are Income and Expenses.

Income consists of fees received from local businesses to display advertising signs on the outfield fence, fees received from team sponsors, collections taken at each game, interest earned from the checking account, income from sales at the concession stand, and income received from miscellaneous sources such as raffles and other fundraisers. These categories comprise the column headings found in Figure 2 (on page 38).

The expenses are: Supplies for the concession stand; equipment purchased (bats, baseballs, uniforms); utilities (telephone and electric charges); scorekeeper, paid \$5 per game; umpires, paid \$12 per game; and miscellaneous (charter fees, insurance). These are the column headings seen in Figure 4 (on page 39).

Before designing the spreadsheets, you should have a journal similar to the one in Figure 1 (below). In this case a journal is simply a list of various items with the expenses they incur and the income they produce. Naturally, the column headings are Expenses and Income.

In double entry accounting, you would make two entries in a journal for each item. For example, if you're entering cash received in sales from the concession stand, the journal entry would be:

Jun 9	Cash	87.64	
	Concession sales		87.64

After making these entries in the journal, you would then post the entries to the proper accounts. The amount of \$87.64 would be added to the Concession sales account for June 9, and

FIGURE 1: Sample Journal

DATE	ITEM	EXPENSE	INCOME
1987			
Jun 4	Signs Fee - Chemung Conol Trust		25.00
Jun 6	Sponsor Fee - American Legion		100.00
Jun 7	Misc. Expense - Charter Fee	14.00	
Jun 7	Supplies - ice and hot dogs	52.25	
Jun 8	Equipment - new cops	152.80	
Jun 8	Utility - telephone	23.40	
Jun 9	Umpires	12.00	
Jun 9	Scorekeeper	5.00	
Jun 9	Collection		9.25
Jun 9	Concession sales		87.64
Jun 10	Signs Fee - Croft Lumber Company		25.00
Jun 10	Signs Fee - Coco Colo		25.00
Jun 12	Sponsor Fee - Rotary Club		100.00
Jun 15	Interest from checking		1.68

FIGURE 2: Sample Income Spreadsheet

a	b	c	d	e	f	g	h
1 DATE	CASH	SIGNS	SPONSORS	COLLECT.	INTEREST	SALES	MISC.
2Bal.Fwd.							
3Jun 04	25.00	25.00					
4Jun 06	125.00		100.00				
5Jun 09	221.89			9.25		87.64	
6Jun 10	246.89	25.00					
7Jun 10	271.89	25.00					
8Jun 12	371.89		100.00				
9Jun 15	373.57				1.68		
10							
11							
50	373.57	75.00	200.00	9.25	1.68	87.64	

FIGURE 3: Sample Income Spreadsheet Formulas

a	b	c	d	e	f	g	h
1 DATE	CASH	SIGNS	SPONSORS	COLLECT.	INTEREST	SALES	MISC.
2Bal.Fwd.							
3Jun 04	b2+c3+d3+e3+f3+g3+h3						
4Jun 06	b3+c4+d4+e4+f4+g4+h4						
5Jun 09	b4+c5+d5+e5+f5+g5+h5						
6Jun 10	b5+c6+d6+e6+f6+g6+h6						
7Jun 10	b6+c7+d7+e7+f7+g7+h7						
8Jun 12	b7+c8+d8+e8+f8+g8+h8						
9Jun 15	b8+c9+d9+e9+f9+g9+h9						
10							
11		c	d	e	f	g	h
50	sum(c2:c49)	sum(d2:d49)	sum(e2:e49)	sum(f2:f49)	sum(g2:g49)	sum(h2:h49)	

\$87.64 would be added to the Cash account.

In the system we are setting up it is necessary to make only one entry in your journal, such as:

Jun 9 Concession sales 87.64

When the \$87.64 is posted to the Concession sales account (column g, titled SALES, in Figure 2) the program automatically adds this \$87.64 to the Cash account (column b, Figure 2) to show the current cash total. The computer always makes your cash entry for you, thus eliminating one half of double entry accounting.

Setting up the spreadsheets

Now for your spreadsheets. With your working copy of Perfect Calc in drive A and a formatted disk in drive B, type in **PC B:INCOME.PC**. Hard disk owners simply have to go to the user area where Perfect Calc is located and type the same thing, excluding the drive specification (PC INCOME.PC).

On line 1 of the blank spreadsheet, put in the column headings as shown in Figure 2 (above). You can see that with lengthy titles it is necessary in some cases to abbreviate column headings to prevent running over into the next title. When you create a different spreadsheet for your own uses, the account headings probably will be different from these, but you should keep all your income sources together. If you have more than six income categories, you can establish another incomespreadsheet, possibly named INCOME2.PC. This same principle applies to the expense sheet.

At cell a2 type in **Bal.Fwd.**, then move the cursor to b3. Enter the formula **b2+c3+d3+e3+f3+g3+h3** and replicate it through cell b50, making all the cells relative (as shown in Figure 3 above). This formula will now automatically total all income

entered in columns c, d, e, f, g, and h, add that amount to the running cash total in column b on the previous line, and place the new cash total on the current line.

Now go to line 50 and put in the following formulas:

at cell c50 — **sum(c2:c49)**
 at cell d50 — **sum(d2:d49)**
 at cell e50 — **sum(e2:e49)**
 at cell f50 — **sum(f2:f49)**
 at cell g50 — **sum(g2:g49)**
 at cell h50 — **sum(h2:h49)**

These formulas will automatically total all figures entered in any cell in the column above them and show it on line 50. I design my accounting spreadsheets to be around 50 lines long because that size fits conveniently on standard 8-1/2 by 11-inch paper.

You have finished the Income sheet, so save it and move on to Expenses. From the system prompt type **PC B:EXPENSES.PC** to begin a new spreadsheet, then enter the column headings as seen in Figure 4.

When you enter the formulas, at b2 put **income[b50]**. (You will get a bad formula message when you first enter this formula. Don't panic. The formula will work fine once the three spreadsheets have been properly linked together.) Now at b3 type in formula **b2-c3-d3-e3-f3-g3-h3** and replicate it through b50 (see Figure 5).

The first formula takes the ending Cash total from cell b50 on the Income sheet and moves it to this location to be used as a beginning total. The formulas from b3 through b50 subtract all expenses entered in any of the six columns from your Cash column to provide a running Cash total.

FIGURE 4: Sample Expense Spreadsheet

o	b	c	d	e	f	g	h
1 DATE	CASH	SUPPLIES	EQUIP.	UTILITY	S.K.	UMPIRES	MISC.
2 Bol.Fwd.	373.57						
3 Jun 07	359.57						14.00
4 Jun 07	307.32	52.25					
5 Jun 08	131.12		152.80	23.40			
6 Jun 08	114.12				5.00	12.00	
7							
8							
9							
50	114.12	52.25	152.80	23.40	5.00	12.00	14.00

FIGURE 5: Sample Expense Spreadsheet Formulas

o	b	c	d	e	f	g	h
1 DATE	CASH	SUPPLIES	EQUIP.	UTILITY	S.K.	UMPIRES	MISC.
2 Bol.Fwd.	income	[b45]					
3 Jun 07	b2-c3-d3-e3-f3-g3-h3						
4 Jun 07	b3-c4-d4-e4-f4-g4-h4						
5 Jun 08	b4-c5-d5-e5-f5-g5-h5						
6 Jun 08	b5-c6-d6-e6-f6-g6-h6						
7	b6-c7-d7-e7-f7-g7-h7						
8	b7-c8-d8-e8-f8-g8-h8						
9	b8-c9-d9-e9-f9-g9-h9						
50	sum(c2:c49) sum(d2:d49) sum(e2:e49) sum(f2:f49) sum(g2:g49) sum(h2:h49)						

Put in the same formulas on line 50 as you did on the Income sheet and save EXPENSES.PC.

The trial balance sheet

Now for the last spreadsheet—the Trial Balance. Start another spreadsheet by typing **PC B:BALANCE.PC**, then type in the account titles as illustrated in Figure 6 (below). Cash and Expenses start in column c, with their corresponding formulas in column f. All Income account titles begin in column d and their formulas in column h.

Put in the formulas exactly as shown in Figure 7 (next page), including those on line 19. Here again, disregard any bad formula messages (and there will be a lot of them).

The function of this spreadsheet is to draw the appropriate figures from the Income and Expense sheets and then add the

two columns for a trial balance.

An important point about accounting: Even if the two columns on your trial balance agree, this does not guarantee the accuracy of your accounts, but it will show if your accounts are in balance. You may have entered an incorrect number or transposed figures. If the trial balance columns are not the same, you know for sure there is a mistake.

Tying things together

The device that makes this whole system work is linking the spreadsheets together, making them *associated files*. Once correctly linked, information entered on one sheet can be shared with the others.

To associate the files, begin with the Balance spreadsheet on your screen. Split the screen with the **^X 2** command and

FIGURE 6: Trial Balance

o	b	c	d	e	f	g	h
1		B-A-B-E	R-U-T-H	T-R-I-A-L	B-A-L-A-N-C-E		
2							
3	June 15, 1987						
4		Cash			114.12		
5		Supplies			52.25		
6		Equipment			152.80		
7		Utility Expenses			23.40		
8		Scorekeeper Expenses			5.00		
9		Umpire Expenses			12.00		
10		Miscellaneous Expenses			14.00		
11							
12			Concession Sales				87.64
13			Sponsor Fees				200.00
14			Sign Fees				75.00
15			Collections				9.25
16			Interest Income				1.68
17			Miscellaneous Income				0
18							
19							
20		T-O-T-A-L-S			373.57		373.57
21							

FIGURE 7: Trial Balance Formulas

	o	b	c	d	e	f	g	h
1			B-A-B-E	R-U-T-H	T-R-I-A-L		B-A-L-A-N-C-E	
2								
3	June 15, 1987							
4		Cash			expenses	[b50]		
5		Supplies			expenses	[c50]		
6		Equipment			expenses	[d50]		
7		Utility Expenses			expenses	[e50]		
8		Scorekeeper Expenses			expenses	[f50]		
9		Umpire Expenses			expenses	[g50]		
10		Miscellaneous Expenses			expenses	[h50]		
11								
12				Concession Sales				income [g50]
13				Sponsor Fees				income [d50]
14				Sign Fees				income [c50]
15				Collections				income [e50]
16				Interest Income				income [f50]
17				Miscellaneous Income				income [h50]
18								
19								
20			T-O-T-A-L-S		sum(f4:f10)		sum (h12:h17)	
21								

answer **NO** to the "synchronize windows" query. Type the command to associate files (^X a), then type **B:EXPENSES.PC** in reply to the "Associate file" prompt. Then press **RETURN**.

With the Expenses spreadsheet on the lower part of the screen, create another associated file using ^X a. This time, type **B:INCOME.PC** in answer to the prompt. Now to see if the three sheets have the correct order of dependency, give the buffer directory command: ^X^B.

Your buffer directory should look like this:

```
b:balance.pc -- > expenses
b:expenses.pc -- > income
b:income.pc
```

The arrows indicate that the Balance sheet is dependent upon the figures in the Expenses sheet and the Expenses sheet depends upon the Income sheet. Each time the sheets are recalculated, Income is done first, then Expenses, and Balance last. Because the Balance is recalculated last, you will always have a current trial balance available.

When you finish entering figures, saving the spreadsheets in normal fashion will preserve the order of dependency.

When you want to do more bookkeeping, always call up the last sheet in the dependency order. In this case that would be **BALANCE.PC**. If you watch your screen, you will see the computer automatically reading in first Balance, then Expenses, and finally Income. Check your buffer directory and you can see that the three sheets are all there, with the arrows still in the proper positions.

Helpful hints

Once you have established all the spreadsheets and saved them, make another copy of each with the ^X^W command. As you probably know, you must give each sheet another file name when you copy it. Now if anything happens to any of the sheets, or you need a fresh one, you have it.

*After you have saved
your spreadsheets,
make an extra copy with
the ^X^W command.*

To avoid long delays while the sheets are constantly recalculating, use the manual mode (^X m m). To recalculate when you desire, hit the exclamation point (!) key.

Enter all Income entries from your journal before the Expenses, as the ending cash total from the Income spreadsheet is the beginning cash figure on the Expense sheet.

Two or more different account entries on the same date may be entered on the same line (see line 5 in Figure 4).

Two or more entries for the same date and same account should each have an individual line to help reduce chance of errors (see lines 6 and 7 in Figure 2).

Conclusion

Although the example system is designed for a baseball league, with appropriate headings it could be used for most any non-profit organization or small business. If you are knowledgeable in accounting procedures, you may also establish other financial reports, such as Retained Earnings Statement, Balance Sheets, and Work Sheets.

There you have it—your own accounting program, not too difficult to design and versatile enough to fit most users' needs.

James Spencer is a retired New York State Police sergeant and freelance writer. He has been treasurer of his local Babe Ruth Baseball League for ten years.

Surges and Spikes are Not Very Nice

Protect your computer and peripherals from power disturbances

by James Carucci

There's only one thing that will positively save your computer and peripherals from a direct lightning strike: a darn good homeowner's insurance policy. But while an insurance policy is a good idea, you should also consider a more realistic hardware approach to the problem of power glitches. Two basic kinds of devices are available to protect your computer from power-related problems: uninterruptible or "stand-by" power systems (often called UPS systems), and power conditioners, of which there are several types.

The stand-by systems offer complete power conditioning and surge protection, along with continued operation in the event of a power failure. But they are expensive, and many computer owners don't consider them a cost-effective solution to their power-related problems.

The average computer user solves the problem of power disturbances with the purchase of a power conditioner. These devices are also known generically as "surge protectors." They may be simple, inexpensive modules designed to plug directly into the wall socket, or they may be elongated metal boxes with multiple power sockets. All of these devices, regardless of size, shape, or price, have the same purpose: they are designed to stop voltage spikes or power surges from entering your computer and melting its motherboard into a puddle of silicon.

Power surge or lightning spike?

Although the terms "surge" and "spike" are often used interchangeably, they are two different things. A spike is a high-voltage event of short duration, usually caused by a lightning strike. In an instant (as quickly as 500 nanoseconds), a lightning bolt can inject over 6,000 volts of electricity into the power lines around your house. If your computer is plugged in, its sensitive circuitry could be damaged. What's more, a lightning bolt many miles from your home can affect your computer just as easily as one that strikes the power pole across the street.

A surge is an event of longer duration. Surges often originate

from conditions within your home. In general, power surges are caused by household appliances containing electric motors. Whenever such appliances are turned off (or cycle off automatically), the magnetic field within the motor collapses, inducing a power surge into your home's wiring. Surges may also occur when electric heaters or similar appliances are first switched on. Such heavy-duty appliances draw large amounts of current as they warm up, sometimes causing momentary power surges.

Build a surge protector to protect your computer from lightning and surges caused by appliances.

Common-sense protection

There are several simple steps you can take right now to help protect your computer and peripherals. First, *always turn off your system and unplug it from the wall socket during local storms*. This may be inconvenient, but it takes only one well-placed lightning bolt to demonstrate the value of this precaution. Remember to unhook your modem from the phone line, too. Your system is safe only when completely disconnected from all power and signal inputs.

Second, if you already own a multiple-outlet power strip, you should double-check its claims concerning spike and surge protection. This can be done easily enough: simply open the terminal strip and examine it. You should be able to identify two or three of the special electronic devices called MOVs (metal-oxide varistors; see the section on "Project design" below). Note that, in general, the multiple-outlet

SURGE PROTECTOR

terminal strips sold at hardware and department stores are not capable of surge protection. A fuse and a circuit-breaker alone will not safeguard your computer from power surges.

Finally, you should check the wall outlet your computer is plugged into. Most surge protectors require a grounded outlet to work properly. The easiest way to check for ground condition is with a circuit tester. Radio Shack sells a device that plugs directly into the wall outlet and indicates whether it is grounded or not (part number 22-101; price \$5.95).

If you discover that your outlet is not grounded, don't panic. You can rig a really good ground with a three-prong adapter and a length of medium-gauge wire. Connect the wire to the ground tab on the adapter and run the wire to a metal pipe or other plumbing fixture. Clamp it to the plumbing and you're grounded. If you are unlucky enough to have ungrounded outlets and plastic plumbing (live in a trailer?), you'll have to run the wire outside your house and clamp it to a scrap of metal pipe (a lead pipe at least two feet long is best). When the pipe is pounded into the earth, the three-prong adapter at the other end of the wire will literally be "grounded."

What else can you do to protect your computer from the ravages of nature and from the power surges caused by the quirky demands of your household appliances? I suggest you build your own surge protector. The design presented here utilizes commonly available parts totaling about \$20. Though not expensive, this home-built device is based on the same components found in more expensive ready-built designs. The finished product will protect a computer and peripherals from most common power line problems. Nothing special is needed to complete this project: a soldering iron, some 18-gauge insulated stranded copper wire, wire strippers and cutters, a rudimentary knowledge of soldering, and the ability to read an electronic schematic. An electric drill is optional.

Why build your own surge protector?

You could pay up to \$100 for a device that will protect your computer from surges and spikes, but even the most expensive power conditioner rarely contains more than \$5 to \$10 worth of actual protection. Aside from paying more than is necessary for surge protection, the real danger lies in trusting your computer to a device that may not be adequate. If, after opening up your multiple-outlet terminal strip, you discover the only "protection" it contains is a fuse and a circuit breaker, do not despair. You can easily and cheaply upgrade it, adding the components needed for protection from power line problems. In addition to the generic "circuit-breaker" type multiple-outlet strips, which have essentially no protection, you may have unknowingly purchased a device that contains some protection, but not enough. Again, this situation can be corrected easily and cheaply with the addition of a few parts.

There are several reasons why you should build your own surge protector. The first is peace of mind. By building your own device, you'll know exactly how much surge protection you have. Second, the project described here is not difficult. And it's perfect for beginning tinkerers because it does not involve any direct modifications to your computer. And finally, you can save a lot of money. But don't underestimate the value of this project. Although the cost is only about \$20, this device will safeguard your machine as well as surge protectors costing three times as much. It may take you some time to collect the needed materials, and you'll need about an hour to

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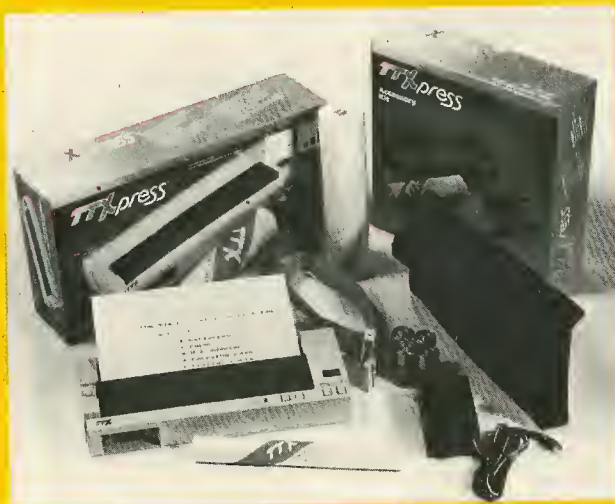


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SURGE PROTECTOR

put it all together, but the result will be a surge protector that you can trust.

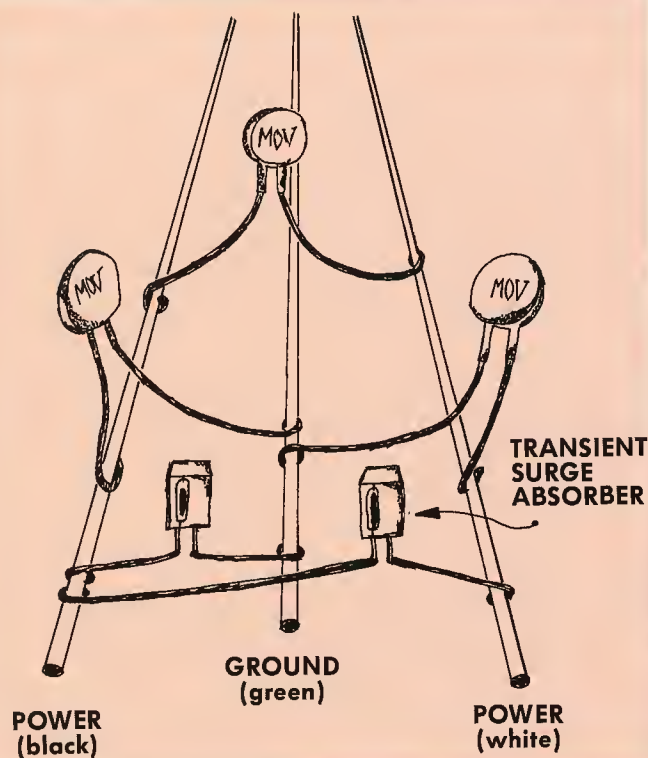
Project design

Metal-oxide varistors (MOVs) are the heart of most surge protectors on the market today. These small electronic devices are manufactured from a ceramic element containing zinc oxide and minute amounts of several other elements. When installed in a surge protector, MOVs act as semiconductors that are only activated at a specific voltage. At voltages up to 130, the MOVs are non-conducting. When a power spike over 130 volts enters the surge protector, the MOVs "sense" the spike and begin to conduct. In short, any input voltage higher than the designed limit of the MOV is "clamped" and harmlessly dissipated as heat. This takes place in an instant; the MOVs react to protect your computer before the voltage spike can damage it.

If you have already purchased a terminal strip that claims to be a surge protector, you should open it up and check to see if it contains any MOVs. A minimum of three are needed to provide adequate surge protection. You should find the MOVs connected across all three possible combinations of wires within the terminal strip, as illustrated in Figure 1.

If you are beginning this project from scratch, you should shop around and buy the cheapest multiple-outlet strip you can find. These are often advertised as "power strips" and can be found on sale at hardware stores, lumber yards, and

FIGURE 1: Placement of Critical Components



SURGE PROTECTOR

discount/variety stores. I recommend you purchase one with six outlets and a lighted power switch. A fuse is nice, but a circuit breaker is not necessary. Don't pay more than \$10 for the power strip, and remember—the larger it is, the easier it will be to install the additional components.

The materials needed to build this project are listed in Figure 2 (below). Radio Shack part numbers and prices are also given.

Figure 2: Parts Needed for Surge Protector

Description of Required Parts	Radio Shack Part Number	Quantity	Unit Price	Total
Metal Oxide Varistor (MOV)	276-570A	3	1.59	4.77
Transient Surge Absorber	270-811	2	.99	1.98
Multiple-Outlet Power Strip	— — —	1	6.98	6.98
Total for Required Parts — \$ 13.73				
Optional Parts				
EMI/RFI Line Filter	273-103	1	5.95	5.95
Toggle Switch — S.P.S.T.	275-602	1	.99	.99
Total for Optional Parts — \$ 6.94				
Grand Total — \$ 20.67				

The three MOVs and two transient surge protectors are the heart of the design and are required. In addition, two optional parts are also listed in Figure 2. The EMI/RFI (Electro-Magnetic Interference/Radio-Frequency Interference) filter helps

isolate your electronic components from additional sources of "noise." Magnetic interference and radio frequency noise are by-products of many common appliances. Your computer may already contain an EMI/RFI filter. However, if you are uncertain about this, it is a simple matter to install one in your surge

If you're beginning from scratch, shop around and buy the cheapest multiple outlet strip you can find.

protector. The filter is by no means necessary; it is simply another electronic safeguard.

The toggle switch is an added feature you may find useful. I keep the DC adapter of my external modem plugged into one of the switched outlets. Although the modem is not really isolated from the alternating current by such a design, the switch does effectively turn the power off. It's much more convenient to turn the modem on or off at the power strip than to grope for the tiny switch on the modem's back panel.

A detailed schematic of the surge protector is presented in Figure 3 (next page). The schematic indicates the placement of

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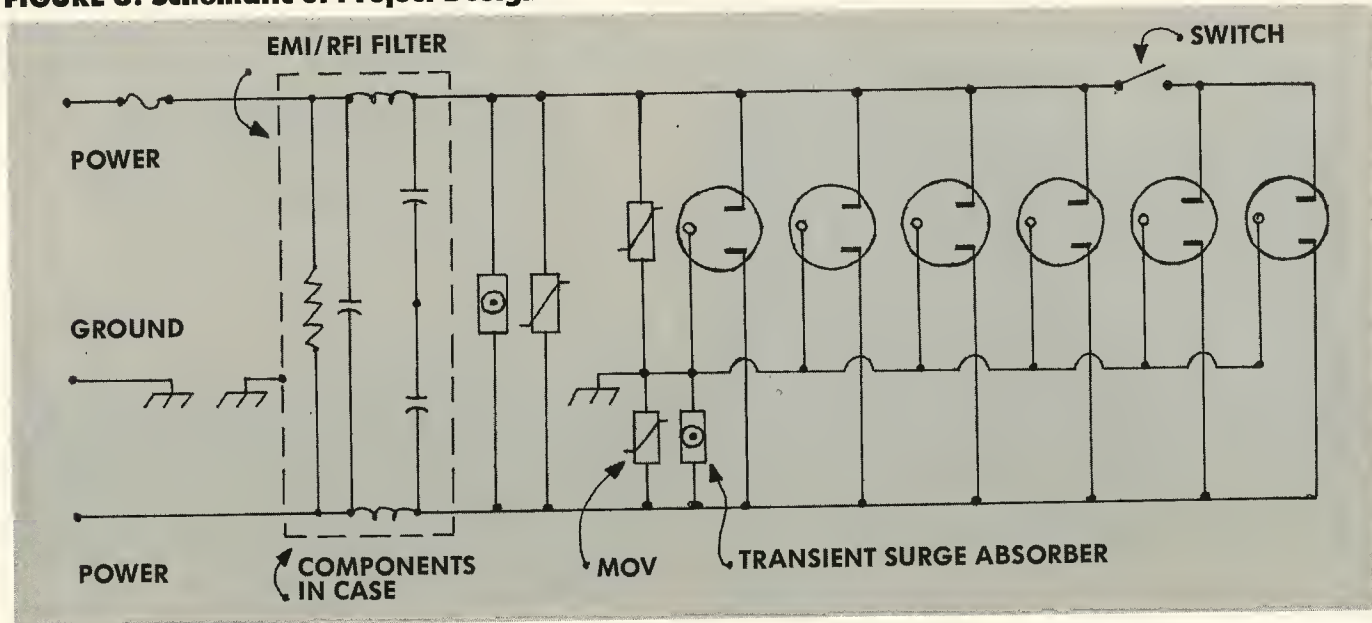
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the optional toggle switch and the EMI/RFI filter component. If you plan to include these items in your surge protector, you'll need a power strip at least 2-1/2 inches wide and 1-1/2 inches deep, or the EMI/RFI filter will not fit.

FIGURE 3: Schematic of Project Design



Step-by-step instructions

You've purchased the needed parts, gathered your tools together, and diligently studied the circuit diagrams. So let's begin.

- 1) Remove the back of your multiple-outlet terminal strip.
- 2) Next, examine the wiring; you should see white wires along one side of the plug sockets and black wires along the other side. If your strip has a wired ground circuit, you will see a third set of green wires. However, many terminal strips are grounded through the body of the plug sockets and the outer case of the terminal strip.
- 3) Based on Figures 1 and 3, determine where to place the three MOVs. One MOV will be connected from black to white, another from black to green, and the third from green to white. Use a pair of wire strippers or a sharp knife to remove a bit of the insulation on the wires. Then solder first one end and then the other end of the MOV to the bared wire. You should install the MOVs near the power-plug end of the terminal strip, but their exact placement is not critical.

4) If no green wires are present, examine the bottom and sides of the plug sockets. Many terminal strip designs have green-tinted screws that are used to ground the sockets in some types of installations. If the screws are present, the black-to-ground and white-to-ground MOV connections can be secured to the screws at one end and soldered to the proper wire at the other. If grounding screws are not present, then connect the ground end of the MOVs to any convenient place on the metal case of the terminal strip.

5) Refer again to Figures 1 and 3, and note that one of the two transient surge absorbers is to be installed across the power leads (white to black). The remaining absorber should be installed between either the white or black lead and the ground. Transient surge absorbers are similar to the MOVs, but

are more heavy-duty. They will take over if an extremely large power surge overwhelms the MOVs, and are entirely effective when installed in pairs; a third is unnecessary. You will probably have to extend the short wire legs of the transient

absorbers by soldering two or three inches of insulated wire to each leg.

6) Determine the placement of the EMI/RFI filter, if you intend to install one. Connect the tabs marked "line" to the wires coming from the plug; connect the tabs marked "load" to the wires leading to the power sockets. The central tab marked "E" (for earth or ground) must be grounded to the power strip case.

7) To install the optional toggle switch, cut through one of the power leads between the middle and last pair of plug sockets. Drill a hole in the side of the terminal strip for placement of the switch. Solder the switch into the power line and install it in the newly drilled hole.

8) Carefully push all components into the case and check for shorts and loose connections.

9) Replace the back of the terminal strip.

10) Plug it in and test it with a small appliance, not your computer. Congratulations—you're done!

Protection and insurance

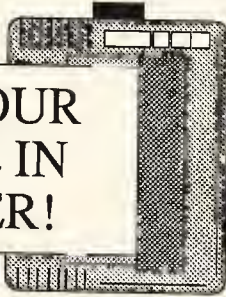
Whether you buy a commercial surge protector or build the project described here, always remember to *underestimate* the extent of your surge and spike protection. Be conservative. Get into the habit of unplugging your computer and peripherals during inclement weather. And although you could spend \$500 on a fancy back-up power supply and conditioner, nothing can beat a solid homeowner's policy that covers storm and electrical damage.

James Carucci is a doctoral student in archaeology. Although he should be working on his dissertation, he finds hardware tinkering more satisfying. He can be reached electronically via the "Paperback" R.O.S. at (618) 529-1595.

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Making Menus with

Put your form letters into a custom menu system

by Joseph Comanda

Everybody knows MailMerge is for form letters. In fact, even though MailMerge is a specific product that works with WordStar, people commonly ask of other word processing packages, "Does it have mail-merge?" when they mean "Can it generate form letters?"

What many people don't know is that MailMerge is a programming language. A programming language in a word processor? A surprising notion, perhaps, but if you've already done some wrestling with MailMerge commands, you may be ready for the idea.

Consider this. MailMerge can do the following things for you:

- display a menu of options on the screen;
- prompt you to make a selection;
- check to see if your selection is valid and give you another chance if it isn't;
- perform the option you requested, if it was valid;
- return you to the menu when the task is done unless you select the option to quit.

Now doesn't that sound like the kind of thing a programmer designs with a programming language?

Don't get me wrong. There are a lot of things MailMerge can't do. It's no substitute for a general-purpose programming language like BASIC or Pascal or a data base programming language such as the one dBASE has. For one thing, it can't do calculations. For another, its looping and decision-making tools, the commands at the heart of any programming language, are somewhat primitive. But what it can do it does well enough.

In this article I will show you how to combine what MailMerge does best with what it can be pushed to do. I'm assuming that you've already been successful at creating form letter instruction files. (For introductory help on working with MailMerge, see my article, "Teaming Up MailMerge with dBASE II or DataStar," in the February 1986 issue, or the "Beginner's Luck" column in the November 1986 issue.)

I'm going to take you a step further. I'll show you how to come up with a simple MailMerge program that allows the user to select a form letter from a menu of available form letters. There are three in my example, including labels (see Figure 1 below). You can incorporate existing MailMerge form letters into such

a menu without making any changes to their contents. All you will have to do is change their file names—more about that later.

FIGURE 1: The Menu

```

Form Letter Selection Menu
=====
1. Print promotional letter
2. Print inquiry response letter
3. Print labels

4. Quit
=====
Enter the number of your selection:
  
```

One word of warning: Some of the commands used in this program are not available in CP/M versions of MailMerge earlier than version 3.30.

MailMerge's programming tools

Before you can create your menu program, you'll have to take a step back from the final result and learn some more about MailMerge's programming tools. As you know, if you've done any work with MailMerge, its tools consist of dot commands—codes that begin with a period, or dot, followed by a minimum of two characters. As with the dot commands in WordStar, they must always be placed at the beginning of a line.

I'll start by analyzing the tasks you might want this menu program to perform, and then I'll discuss the tools you'll need to use to accomplish them. Remember the list of things I said MailMerge could do for you? Here they are again in terms more specific to your Form Letter Selection Program. You'll want it to:

- display a menu of available form letters on the screen;
- prompt you to make a selection;
- check to see if your selection is valid (i.e., between "1" and "4") and give you another chance if it isn't;
- perform the option you requested, if it was valid (i.e., print the form letters or labels you asked for), or quit;
- return you to the menu when the task is done.

Displaying a menu on the screen

MailMerge has three commands that control screen display. I'll deal with two of them now. The first command, .CS, clears the

MAILMERGE

screen. You won't use it at the beginning of the menu system, but you will use it at various other points in the program.

The second command, `.DM`, displays a message on the screen a line at time. The command `.DM Hello, how are you today?` displays the message "Hello, how are you today?" on the first available line on the screen. If you want a blank line, you can use a Display Message command on a line by itself without a message.

Our menu will consist of the following series of Display Message commands:

```
.DM                      Form Letter Selection Menu
.DM                      =====
.DM                      1. Print promotional letter
.DM                      2. Print inquiry response letter
.DM                      3. Print labels
.DM
.DM                      4. Quit
.DM                      =====
```

Prompting the user for a selection

MailMerge has an Ask for Variable command (`.AV`). If you used a variable before in MailMerge, chances are it stood for a category of information in a mailing list data file like CITY or STATE. Here you're going to use a variable to stand for whatever you select from the menu, so you'll call your variable CHOICE. The Ask for Variable command also lets you display a prompt message (it's the third screen display command), so you'll use a command like this one.

```
.AV "
```

```
Enter the number of your selection: ",CHOICE,1
```

That means: display the prompt message (whatever is inside the quotes) on the screen, wait for the user to type in a single character (the "1" at the end of the line limits entry to one character), and then set the value of the variable CHOICE to whatever the user types in. Notice all the space at the beginning of the prompt message. That's just there to center the message on the screen.

Checking to see if a selection is valid

You'll need some decision-making tools for this. You don't want

the program just to check for validity—you want it to decide what to do about your choice, too. If you pick a valid choice, you want it to go ahead and perform the task for you. On the other hand, if you pick an invalid choice, one that's not on the menu, you want MailMerge to interrupt the normal execution of the program and tell you that you made a mistake. You want it to say, "Wait a minute there. This just won't do. Better try again."

MailMerge has two decision-making tools, an *If* command (`.IF`) and an *Except* command (`.EX`), and they perform similarly. Both test to see if certain conditions are true or false, and depending on which is the case, they go to different parts of the program using a GOTO command.

The `.IF` command does the GOTO jump if the conditions are true. Otherwise it ignores the GOTO command and proceeds with the next line of the program. For example, you could issue a command like: `.IF CHOICE = "4" GOTO END`, where END is a location in the program. MailMerge would check the value of CHOICE. If it was "4," it would jump to the END location of the program and begin executing any commands it found there.

The `.EX` command works the opposite way. It only does the GOTO jump if the conditions are false. That's what you'll use in your program to check for invalid entries. The command will look like this:

```
.EX &CHOICE& > "0" .AND. &CHOICE& < "5" GOTO WRONG
```

It tells MailMerge to check the value of CHOICE that you entered. If it's not between "1" and "4," you want MailMerge to jump to a part of the program called WRONG where you can

take care of that problem. If your choice is valid, it will ignore the GOTO command and proceed with the next line of the program. Notice that this command evaluated two conditions separated by an `".AND."` operator to test for the upper and lower limits of the acceptable range. You can also combine conditions with `".OR."` operators.

Since `.IF` and `.EX` commands tell MailMerge to go to certain locations, you need a way to put place markers into the program so MailMerge can find them. MailMerge has what it

(continued on page 57)

The Basics of BASIC

Part 2: Cultivating order and efficiency

by Jerry Houston



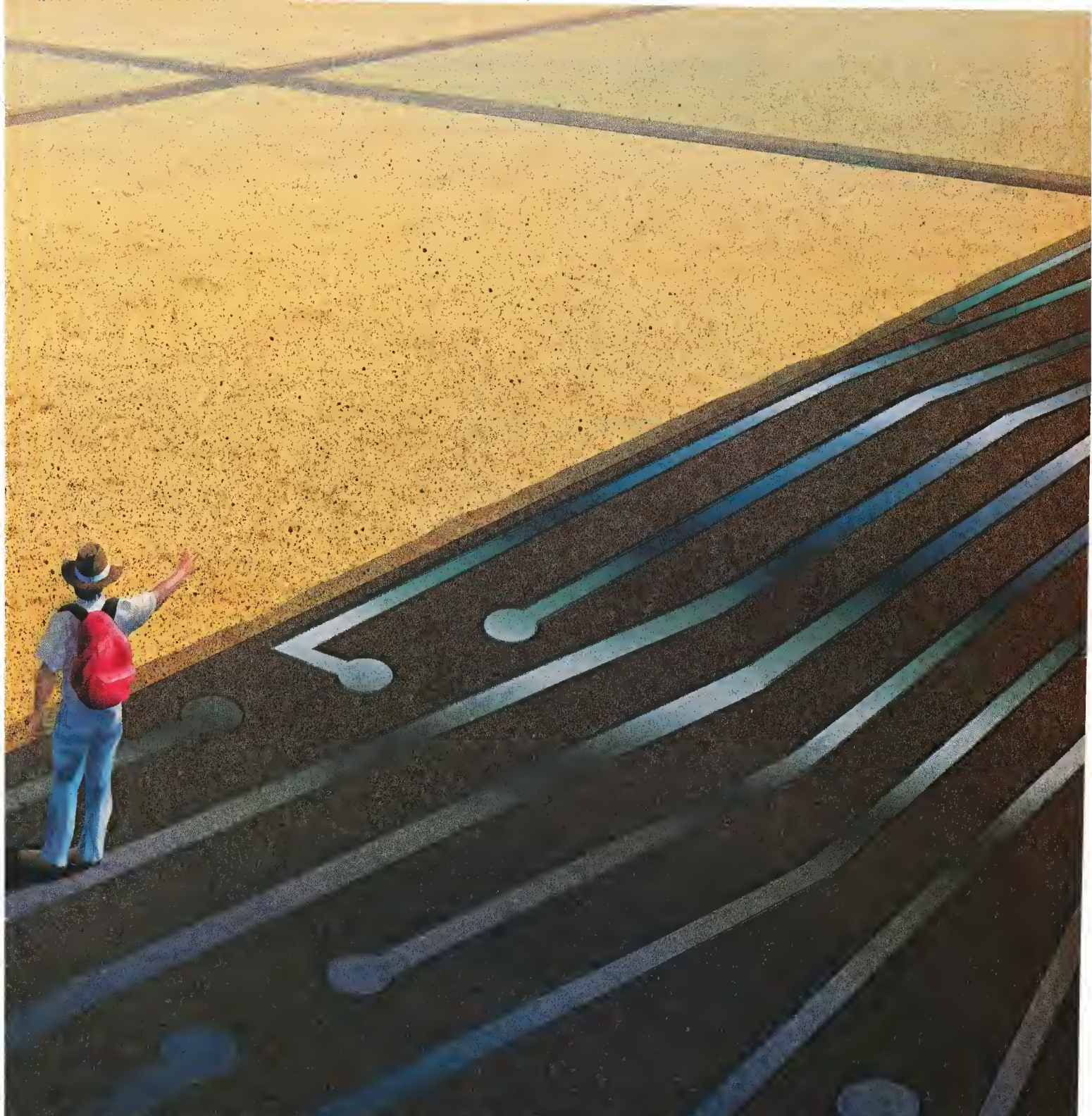
Last month we explored what BASIC is, where it came from, and what it is meant to do. In this article, I'll assume that you have investigated the version of BASIC that came with your computer and that you understand the elementary aspects of writing BASIC programs. The purpose of this article is to introduce beginning BASIC programmers to somewhat more advanced programming techniques.

I'll explain how BASIC handles math operations, input and output, and character strings. I'll also tell you how to apply the principles of "structured programming" to BASIC. A structured program is one that is organized into a series of separate sections — often called modules — each of which accomplishes

a single specific task. Each module is written and, if possible, tested independently of the rest of the program. By breaking a program down into smaller tasks and accomplishing those tasks one at a time, you ensure that the entire program functions as efficiently as possible.

Unlike Pascal, C, Modula, and some other languages, BASIC is not considered a structured language, but even so, it is possible to write structured programs in BASIC through the efficient use of subroutines, sequence and decision statements, and branches and loops.

Since both MBASIC (for CP/M-80 machines) and GW-BASIC (for MS-DOS machines) were developed by Microsoft, they share many characteristics. In an article of this length, I will of



necessity stick to language elements that are common to both versions.

BASIC statements

Last month I showed that BASIC contains many keywords, some of which are statements and some of which are commands. *Commands* are generalized keywords such as RUN, LIST, and SAVE that affect a program in its entirety. *Statements*, which contain keywords such as INPUT or PRINT, usually followed by one or more "arguments" (or "parameters"), are executed *within* a program and affect the data that is being processed, not the program itself.

Because BASIC depends so heavily on line numbers, let's

sum up the rules about using them: They need to be in ascending order, but they don't necessarily have to be consecutive. They are customarily used in increments of 10. If a BASIC statement is typed with a line number smaller than the one in the preceding statement, it will be accepted, but the lines will automatically be put into numeric order within the program. Typing the command LIST will show all program lines in their correct order. If a new line is entered with the same line number as a previous line, the new line replaces the old one. This is an easy way to replace an entire line that's in error, but it is equally easy to erase or replace a line accidentally, so be careful. Finally, if statement lines are numbered in increments of 5 or 10, it's an easy matter to insert statements

that were inadvertently left out. If the lines are numbered consecutively (1, 2, 3, etc.), then existing statements will have to be renumbered before others can be added. Renumbering the lines isn't a big problem, but numbering the lines by 5s or by 10s in the first place is even easier.

BASIC statements fall into the three categories: sequence statements, decision statements, and loops. These categories correspond to the three basic structures from which any computer program can be built: assignment, decision, and iteration. In this article I'll describe those three necessary coding structures in more detail and show in particular how they are implemented in BASIC.

Renumbering lines isn't a big problem, but numbering them by 5s or 10s in the first place is even easier.

Sequence statements

In the simplest programs, statements are executed one after another, in sequence. Assignment statements, wherein values are assigned to memory variables, are a good example of sequence statements. In the original version of BASIC the optional keyword LET was used to begin an assignment statement:

```
10 LET SUM = 15
```

The word LET was used to highlight the fact that this was an assignment statement and not a relational expression, which also uses the equals (=) character in BASIC.

BASIC uses the so-called "double quotes" (actually they're just quotes, as opposed to apostrophes) to delimit character strings—to show where they begin and end. It is a syntax error to assign a value of one type to a variable of the other type, or to try to do anything with a string of characters that is not delimited by quotes.

Math operations

Math is accomplished with a special case of the assignment statement, one that assigns the result of a complex expression to a variable. One of the math operators is the asterisk (*); it stands for multiplication. Thus, the circumference of a circle can be calculated and assigned to the variable CIRCUM in a single operation with the statement:

```
50 CIRCUM = 3.14159 * DIAMETER
```

It is an error in BASIC to say:

```
50 3.14159 * DIAMETER = CIRCUM
```

even though that would be perfectly acceptable in algebra. If you think of the "=" operator as the "becomes" operator it's harder to make a mistake.

The other math operators used in BASIC are the same ones

used in common arithmetic, plus the caret symbol (^), which means "to the power of." Thus:

```
70 ANSWER = VALUE ^ 3
```

assigns the cube of VALUE to the variable ANSWER. As in algebra, the cube root of a value can be approximated with the statement:

```
75 ANSWER = VALUE ^ (1/3).
```

(The parentheses are needed to override the default precedence of the exponential operator, which is higher than the division operator. If this expression had been written as ANSWER = VALUE ^ 1/3, BASIC would have seen it as "VALUE to the first power divided by 3.")

Math expressions in BASIC are evaluated according to the following table of precedence, with operations at the same level evaluated left to right:

BASIC TABLE OF PRECEDENCE (from highest to lowest)

1. Parentheses
2. Exponentiation
3. Multiplication and Division
4. Addition and Subtraction

As you can see from this table, parentheses can be used to enforce a different "order of calculation." Redundant parentheses will not slow down a BASIC program noticeably, so it's best to use parentheses any time they make the logic of the program clearer.

Parentheses can be used to enforce a different "order of calculation" in an expression.

Input/output

The operations that move data into or out of a program are complex. They are handled by functions of the operating system, which are in turn called upon by statements within a language. "All About BASIC Input/Output" could easily be an entire article in a series like this, so I will limit this discussion to the I/O statements used in beginning programming.

A common method of input is for the user to type information at the keyboard. The statement used to do that is the INPUT statement, one of the very first statements most BASIC programmers learn to use. The INPUT statement can be enhanced with a prompt message. If you'd like to display something other than BASIC's question mark prompt, you can specify that message by putting it within quotes and placing it before the name of the variable. To ask someone to enter his or her name, you could use:


```
90 INPUT "Please enter your name: "; NAME$
```

The prompt that you supply replaces the question mark prompt that BASIC would ordinarily provide.

To get information out of the program, we often use the PRINT statement. This is a very powerful statement that deserves much more discussion than I can provide here. You can write some very useful BASIC programs even if you know just a little about the PRINT statement. PRINT can be used to output (print to the screen or to a file) both numeric variables and strings. Its companion statement, LPRINT, is used to send output to the (line) printer and differs only in where the output goes.

PRINT ordinarily adds a carriage return and a linefeed to each line, placing the cursor at the beginning of the next line. If something is PRINTed on the last line of the screen, then the screen will "scroll" up one line. To defeat this automatic "newline" and scrolling, put a semicolon at the very end of the print statement.

String operations

String variables are often used to contain input that comes from the terminal, even if that input is to be regarded by the program as numeric. If the program is expecting a number value, and the user accidentally enters an alphabetic character,

the program will quit.

If, however, a string variable is requested with the INPUT statement, then either a numeric value or a string value can be entered without any trouble (numeric digits can also be considered as characters). A string variable can't be used in a math operation, but a string function can be used to copy its value to a numeric variable. This function is called VAL(), and it is used like this:

```
520 INPUT "Please enter a number: "; INSTRING$
530 NUMBER = VAL (INSTRING$)
```

The function VAL() evaluates its string argument (in this case, INSTRING\$) and puts the numeric value it represents into the variable NUMBER. If INSTRING\$ cannot be resolved to a numeric value, then NUMBER ends up as zero.

Another common string function is LEN(), which returns the LENGTH, in characters, of its string argument. If the variable NAME\$ (usually pronounced "name-string") happened to have the value "Penelope," the statement:

```
540 NAME_LENGTH = LEN (NAME$)
```

would put the value 8 into NAME_LENGTH.

The above functions, though they operate on strings, actually return numeric values. Some string functions return string values; they are distinguished by the "\$" that follows

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their name, just as this symbol identifies a string variable.

LEFT\$() and RIGHT\$() use arguments that point to a source string and a number of characters. They return that number of characters from the left or right end of the source string. For example, if we were looking for a file name from the user, which is limited to eight characters (because of operating system requirements), we could let the user type whatever he wanted, then take just the first eight characters from the left side:

```
550 INPUT "Please enter file name: "; INSTRING$
560 F_NAME$ = LEFT$( INSTRING$, 8 )
```

RIGHT\$() works the same way, but it returns a number of characters from the right side of the string. MID\$() uses two numeric arguments instead of one to identify the starting point and maximum number of characters to accept, beginning at the point designated by the first argument. Thus, it can return a string from the MIDDLE of another string. Sometimes it is important for a string to be "padded" with blank spaces or other characters. Remember that strings can be "concatenated" (connected together) using the "+" operator. If we needed the field occupied by NAME\$ always to be 15 characters long, even though individual names might be shorter, we could use the following method to pad NAME\$ to a length of 15:

```
570 NAME$ = LEFT$(NAME$ + " ", 15)
```

First, the value in NAME\$ is appended with 15 blanks, then

the first 15 characters of that combination are assigned to NAME\$. If we wanted the padding to be placed to the left and the resulting name to contain 15 characters, then the statement would be:

```
580 NAME$ = RIGHT$(" " + NAME$, 15)
```

Decisions

Decisions are made in BASIC with the keyword IF, just as they are in English and in most other computer languages. The word IF is followed by a proposition (sometimes called a "condition") in which an expression is evaluated as either TRUE or FALSE.

The proposition is normally constructed using the relational and equality operators. The following is a table of these operators:

TABLE OF RELATIONAL/EQUALITY OPERATORS

A = B	A is equal to B
A > B	A is greater than B
A < B	A is less than B
A >= B	A is greater than or equal to B
A <= B	A is less than or equal to B
A <> B	A is not equal to B

Sometimes relational expressions are connected with the logical (Boolean) operators AND and OR to form longer expressions that are evaluated as TRUE or FALSE in their entirety. The logical operator NOT is a unary operator, meaning that it requires only one operand. If SOMETHING is TRUE, then NOT SOMETHING is FALSE. In complex relational expressions it is best to use parentheses to clarify the order of expression evaluation whenever confusion might be possible.

The consequence that results from a proposition being true can be thought of as the THEN side of the decision. If any consequences result from the same proposition's being FALSE, then there is an ELSE side. (Please refer to my article on flowcharting in the December/January PROFILES on decision structures.)

Indenting

Sometimes a single line of BASIC code can become extremely difficult to read, especially if it contains several statements. For example, to evaluate the variable SALES and print the word "BONUS" if SALES is greater than the variable QUOTA, we could use the statement:

```
90 IF SALES > QUOTA THEN PRINT "BONUS"
```

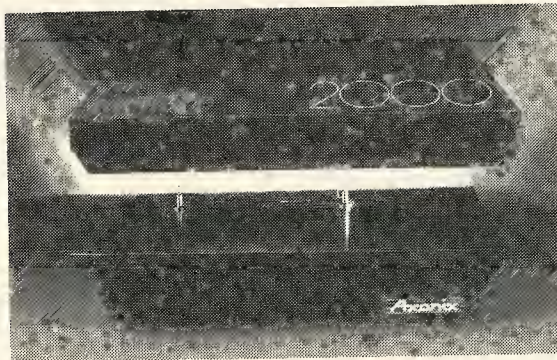
To print the message "NO BONUS" for those cases where SALES were not greater than QUOTA, there would be an ELSE side to the decision. This could be written:

```
90 IF SALES > QUOTA THEN PRINT "BONUS" ELSE PRINT "NO BONUS"
```

Written this way, the line is not very readable. But when you separate the statements into several lines and indent them, it looks like this:

```
100 IF SALES > QUOTA
    THEN
        PRINT "BONUS"
    ELSE
        PRINT "NO BONUS"
```

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This is so much easier to comprehend that you almost don't have to read the code to understand it; the way it looks tells you what it does.

You cannot, however, move down a line by pressing RETURN or ENTER. BASIC will interpret that to mean that you have ended a line of code (called a logical line) and wish to begin another one. You can fool BASIC, though, by using a linefeed (^J) to move to the next physical line onscreen, while the logical line remains the same. You will see the cursor move down, but as far as BASIC is concerned you're on the same line.

The GW-BASIC editor won't allow you to enter ^J as a linefeed, but its interpreter will gladly accept it as shown. You can always use another editor, such as WordStar in non-document mode, to write the program, then LOAD and RUN it with GW-BASIC. To type a ^J from WordStar you must preface it with the "literal" print command ^P. So to insert a line feed you would type ^P^J.

Multiple statements can be combined into one logical line of code by using colons to separate the statements.

Branching

Earlier in this article I said that the simplest computer program is a series of statements that are executed sequentially. Only the most trivial programs, however, can be executed in a purely sequential manner. We must be able to branch to a different instruction as the result of a decision.

An unconditional branch is one that is always executed, without exception, and in BASIC that is the GOTO. It is considered by most good programmers to be a four-letter word and a type of statement to be used only in desperation. This is because you can GOTO a certain section of code, then GOTO another, and another, and soon you have no idea where you are or even what is happening with the program. GOTO is often a feature of poorly designed programs that haven't been well thought out, and most skilled programmers are at least a little embarrassed to have someone find a GOTO in one of their programs.

The desperate situation in which using a GOTO might be legitimate is when a programmer tries to implement a logical structure that another language has, but BASIC does not. In translating an existing program from Pascal or C into BASIC, for example, sometimes it is necessary to use GOTO to simulate a structure if it would require an extensive rewrite of that part of the program to do it BASIC's way. The rule here is, "If using a GOTO will greatly simplify the program, then go ahead—but always document your reasons for doing so." Use the REMark statement, or its shorthand replacement, the apostrophe, to explain why you needed to use GOTO. Not surprisingly, in explaining the need for the GOTO, programmers often discover how to do the same thing without one!

It would be appropriate to simulate a CASE structure in BASIC with the following example, in which we ask the user to

type in a selection from a menu (a list of choices). Assume that we have already printed the list of choices to the screen. The user's selection will come into the program as the variable CHOICE, which will have three usable values: "A," "B," or "C."

```
200 INPUT "Enter your selection: "; CHOICE
210 IF CHOICE = "A"
    THEN
        GOSUB 300
    ELSE
        IF CHOICE = "B"
            THEN
                GOSUB 400
            ELSE
                IF CHOICE = "C"
                    THEN
                        GOSUB 500
                    ELSE
                        GOTO 200      ' accept only A, B, or C
```

In this case, the "GOTO 200" takes care of the chance that someone might make an invalid entry. The remark that follows it explains why the GOTO is used. Don't use absurd comments like "go back to line 200" that don't convey any useful information. In this case, there should be an additional REMark line that tells what each of the GOSUBs accomplishes. Unfortunately, BASIC can't cope with a comment in the middle of a line, and since this is all one IF statement, we can have only the one comment at the end.

Multiple statements can be combined into one logical line of BASIC code by using colons (:) to separate the statements. This practice is usually to be avoided for the sake of creating understandable programs, but there are times when BASIC syntax requirements leave no choice. Also, there might be several very small parts to one significant task, and keeping them on the same line alerts a maintenance programmer that they must be kept together. If a program's logic requires a message to be printed, a value to be assigned, and a subroutine to be executed as the result of a decision, then it could be written as:

```
220 IF A = B
    THEN
        PRINT "THEY ARE THE SAME":
        X = B:
        GOSUB 400      ' process entry
```

Subroutines

The above examples show a variation of GOTO that a programmer doesn't have to apologize for—the GOSUB. GOSUB means "go to the subroutine starting at" and is as close as BASIC gets to the way "named routines" work in structured languages. A subroutine is a collection of statements that performs some identifiable task.

A subroutine should start with one or more remarks explaining what task is being accomplished. At least the last line in the subroutine must contain the keyword RETURN, which tells BASIC to "go back where it came from." BASIC RETURNS to the

statement after the one in which the GOSUB instruction was executed. Additional RETURNS are optional if they are the result of a decision (IF such-and-such THEN RETURN now, ELSE do some more computing and RETURN later.)

It's called a "nested subroutine" when one subroutine calls a second subroutine, which might call a third, and so on. Nesting of subroutines is often useful and sometimes even necessary, but it does make the logic a little hard to follow. At worst, it can make a program extremely difficult to debug. I'm convinced that the difficulty of understanding a program's logic varies exponentially with the depth of subroutine nesting that's used in it.

There is one danger inherent in subroutines in BASIC. A program can get into a subroutine either by being sent there explicitly (GOSUB 300) or by falling into it by sequentially executing statements that lead into it (. . . 280, 290, 300). It's a real problem when a subroutine is entered the latter way. Eventually the program will reach a RETURN statement but it won't know to where to return (since no address was placed on the stack by a GOSUB statement). This results in a "RETURN WITHOUT GOSUB ERROR" that can be frustrating. You know there is a GOSUB to get to the subroutine, and you can't imagine why the error was generated. What you don't realize is that this time your program got into that subroutine without being sent there intentionally.

Avoiding this problem is another legitimate use of the GOTO statement. A subroutine can be preceded by a branch that sends control to the first statement afterward, making it impossible to enter the subroutine without a GOSUB statement:

```
290 GOTO 340 ' don't enter subr accidentally
300 ' Subroutine to put the smaller of
310 ' X or Y into the variable MINIMUM.
320 IF X < Y THEN
    MINIMUM = X
ELSE
    MINIMUM = Y
330 RETURN
340 ...the program continues here
```

Looping

The most powerful structure in a computer program is the loop, which lets us write a section of code once and then execute that section as many times as necessary. Sometimes a loop is executed a given number of times; sometimes it is performed until a condition becomes true or false.

Most modern BASICs provide a WHILE statement, as do many other languages. Technically speaking, BASIC's WHILE loop is the classic pre-test loop that is one of the three required structures for writing computer programs. It's also called a top-driven loop, because the decision on which it is based is made first, at the top of the loop. If the proposition tests untrue, the loop is not executed, not even the first time. If true, the following block of code will be executed as long as the proposition stays TRUE. The WEND statement (While END) indicates the end of the block of code associated with the nearest previous WHILE. Here's an example that calculates the sum of the squares of the first 25 positive integers, then prints

the result:

```
400 NUM = 1 : SUM = 0 ' initialize
410 WHILE NUM <= 25 ' loop begins here
420 SUM = SUM + NUM ^ 2 ' add in the square
430 NUM = NUM + 1 ' increment counter
440 WEND ' loop ends here
450 PRINT "The Sum of the Squares is "; SUM
```

Notice two things about the WHILE loop: Its proposition must start out TRUE, or the loop won't be executed at all. Somewhere within the loop there must be a statement that eventually makes the proposition FALSE, or the loop will be never-ending.

BASIC also has a FOR..NEXT construction that executes a section of code a specific number of times. It's actually a special case of the WHILE loop, in which BASIC does part of the work for you. Consider again the example of writing the sum of the squares of the first 25 positive integers:

```
400 SUM = 0 ' initialize SUM
410 FOR NUM = 1 TO 25 ' loop begins here
420 SUM = SUM + NUM ^ 2 ' add in the square
430 NEXT ' loop ends here
440 PRINT "The Sum of the Squares is "; SUM
```

The initial value of the loop counter, the increment, and even the direction in which the loop goes can be changed. The increment defaults to 1 because that's the most common. It can, however, be a fraction, or even a negative number. If it is different from 1 it must be set with the STEP keyword. As a quick example, consider that you might want to do something with every tenth of an inch from two inches on down to zero. The FOR statement for that loop would be:

```
450 FOR SIZE = 2 to 0 STEP -0.1
```

Again, see your BASIC manual for all the details. Let me finish this discussion of FOR..NEXT loops by showing that indentation is essential to understanding what the loop is doing. In the following example of nested FOR..NEXT loops, the inner loop is executed (A * B), or 24 times. Thus, COUNT will count upward by 2s, for a total of 24 times, and it will end up with a value of 48 when the loops are finished:

```
450 COUNT = 0 ' initialize counter
460 FOR A = 1 to 4 ' outer loop - 4 times
470 FOR B = 1 to 6 ' inner loop - 6 times
480 COUNT = COUNT + 2 ' increment count by 2
490 NEXT ' end of inner loop
500 NEXT ' end of outer loop
510 PRINT "COUNT IS: "; COUNT
```

Conclusion

Writing computer programs can be productive and fun. BASIC, because of its symbolic nature and ease of use, is a good choice for the beginning programmer, if its pitfalls can be avoided.

Jerry Houston teaches computer subjects at two Seattle-area community colleges and is busy writing textbooks on the C language and structured programming logic.

calls an End command (.EF) that serves exactly that purpose. "End" is a misleading term, since it doesn't have to be at the end of the program, so just think of it as a place marker. For example, the command line .EF WRONG means this is where WRONG is. When MailMerge is moving through a sequence of commands a line at a time, it ignores place markers, but when it is trying to obey a GOTO command, it looks ahead for the appropriate place marker, jumps directly to it (skipping over any command lines in between), and begins executing the next command line it encounters.

The menu program: a closer look

Now you're ready to take a look at the whole program (see Figure 2 below). It should start to make sense to you. Lines 1-8 display the menu options on the screen. Line 9 prompts the user for a choice. Line 10 is the first decision line. As you've seen, it checks to see that you've made a valid choice. If your choice was fine it goes on to line 12, but if it wasn't, it jumps to the WRONG place marker at line 16 and begins executing the commands starting at line 17.

FIGURE 2: Menu Program Listing

```

1  .DM
2  .DM
3  .DM
4  .DM
5  .DM
6  .DM
7  .DM
8  .DM
9  .AV "
10 .EX &CHOICE& > "0" .AND. &CHOICE& < "5" GOTO WRONG
11 .IF &CHOICE& = "4" GOTO END
12 .CS
13 .DM
14 .FI FORM.&CHOICE&
15 .IF &CHOICE& > "0" .AND. &CHOICE& < "4" GOTO REPEAT
16 .EF WRONG
17 .CS
18 .AV "
19 .EF REPEAT
20 .CS
21 .FI MENU
22 .EF END

```

Form Letter Selection Menu

=====

1. Print promotional letter

2. Print inquiry response letter

3. Print labels

4. Quit

=====

Enter the number of your selection: ",CHOICE,1

Now printing

Invalid option. Hit RETURN and try again.",RETURN

You can now see what happens when you make a wrong choice. MailMerge clears the screen (line 17) and then uses an Ask for Variable command (line 18) to display an error message on the screen. You could use a Display Message command instead, but then the message might scroll off the screen. The Ask for Variable command stops the program to wait for user input. That input will go into a variable called RETURN, but it could have been called anything, and you're not going to do anything with it. It's just a way of getting an acknowledgment that the user has seen the message and that it's okay to proceed.

When the user hits the RETURN key, MailMerge moves on past the place marker in line 19, clears the screen (line 20), and then reloads the menu program using MailMerge's File Insert command (line 21). In form letters the File Insert command lets you incorporate stock text into the body of a letter. Here it lets you re-run the menu program. The command .FI MENU tells MailMerge to go get the file called MENU on the currently logged disk drive and then start following the instructions in it, and that, of course, will take you around to the top again.

So now you know what happens if you make a mistake. What happens if you make a valid choice? Look back at line 10 where the decision is made. If the choice is valid (i.e., between "1" and "4"), MailMerge ignores the GOTO WRONG command and

"End" doesn't have to be at the end of a program, so just think of it as a place marker.

proceeds to line 11. There it encounters another decision command. If CHOICE equals "4" it jumps to END (line 22) and passes out of the program, skipping over, among other things, the File Insert command on line 21 that would have redisplayed the menu.

If you select any of the other valid options, MailMerge ignores the GOTO command on line 11 and proceeds to line 12. Here again it encounters a Clear Screen command and a message to display, "Now printing." These two commands are pure cosmetics. The important work gets done in line 14: .FI FORM.&CHOICE&.

The contents of the variable CHOICE, surrounded by ampersands just like a variable in a form letter, are going to complete the name of the file MailMerge looks for. In other words, if you selected "1," it looks for the file on the currently logged drive with the name FORM.1, and if you typed in "2," it looks for FORM.2 When it finds that file, it does whatever it's told to do in it. If FORM.1 has instructions for printing a form letter using names and addresses from a certain mailing list data file, that's what MailMerge will do. If it has instructions for printing labels, MailMerge will do that. When it's finished, it will come back to the Menu program and execute the next line down (line 15).

Line 15 is there because you need a way to jump over the

commands on lines 17 and 18, which only apply to wrong menu choices. In effect, line 15 says to MailMerge, "We're dealing with a valid choice here so let's just skip the next few lines and redisplay the menu." The command takes you down to line 19, where the menu gets reloaded after clearing the screen.

Well, that's it. Whenever you finish running a set of form letters or labels, you come back to the menu. You can then print something else or quit.

So now that you've written the program, how do you use it? Just like any other MailMerge file.

Writing the program

You can write the program with WordStar using either document or non-document mode. Make sure each command line begins with a dot in column 1. (Those line numbers are not part of the command lines. They're just here in the article to help you find your place.) And be careful about syntax and punctuation. MailMerge is forgiving of discrepancies between upper- and lower-case letters and sometimes doesn't care whether or not you put spaces between elements of a command line, but you're better off following the rules rigidly.

Here are some tips on tricky things to keep in mind. When you display messages with the Display Message command you don't need to put quotes around it, but when you do it with the Ask for Variable command, you do. In If and Except statements, the variables should always be surrounded by ampersands, and their values should always be in quotation marks (e.g., .IF &CHOICE& = "1" GOTO SOMEWHERE, not .IF CHOICE = 1). Also, when you combine conditions with .AND. or .OR. operators, don't leave off the surrounding periods.

While you should follow the syntax somewhat slavishly, there's no reason you can't customize the program to suit your needs. For example, you may want to have six menu choices. To incorporate all of them, you'll need to do several things. First, you'll have to add lines to the menu or maybe double up two choices on a line. Next, you'll have to change the acceptable limits on valid choices in lines 10 and 15. And of course, you may change the number to select to quit, which would affect line 11.

You may also have files set up on different drives. As the program is set up now, it assumes all the files will be on the logged drive. If you wish to change that, you can specify a drive with the File Insert commands (e.g., .FI MENU can become .FI B:MENU or .FI A:MENU, or whatever).

Finally, you need to know about your form letter file names. The program depends on the use of numbers in the file name extension to correspond to menu choices, and you'll have to change your form letter file names to match that. There are ways of writing the program to be independent of such number associations, but it would be more complex. If you're interested in pursuing it, you can find an example of how to go

about it in the book mentioned at the end of this article.

Using the menu program

So now that you've written the program, how do you use it? Just like any other MailMerge file. To start the menu program running, you select the M (Run MailMerge) option on WordStar's Opening Menu and type in the file name, MENU. In most cases you can just hit the ESCape key at that point to bypass the usual questions, and you're on your way.

There are only a few things to keep in mind. First, the menu will work better if you turn off the file display first. (Option F on the Opening Menu toggles the file display on and off.) It will keep the screen less cluttered and speed up the time it takes for the menu to scroll onto the screen.

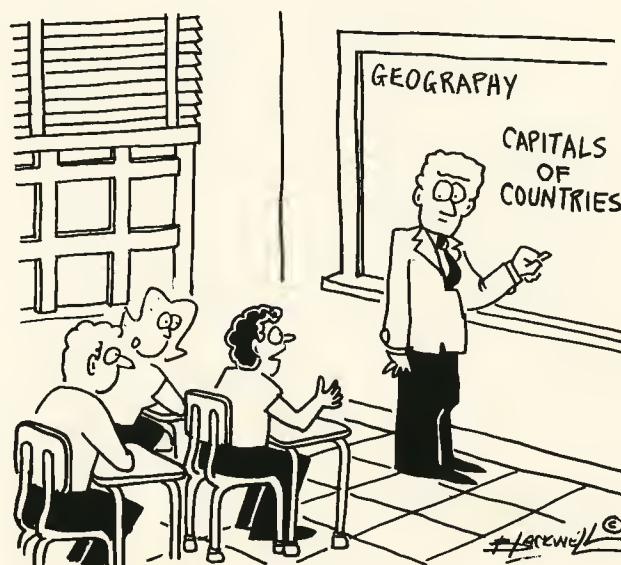
Second, you should not have WordStar set up to pause between page breaks. If you do, MailMerge will jump outside your menu system every time it reaches the end of a page. The program will still work, but you'll find it somewhat confusing (you won't know quite where you are) and very tedious.

If you have other problems running it, check to see that you've entered it correctly. If you can't find your mistake there, maybe it's in one of the form letter instruction files. Remember, they should be able to run equally well on their own or with the menu system. If they seem not to be working correctly, test them independently until you're satisfied that they're okay.

What next?

Once you've got this program running nicely, you may want to try other things. A good place to look for more ideas is *Getting the Most from WordStar and MailMerge* by M. David Stone (Englewood Cliffs, New Jersey: Prentice Hall, 1984).

Joseph Comanda is a freelance writer and data base consultant living in Philadelphia.



"Memorize! Why not just access a data base?"

Beginner's Luck

Learning DataStar

by William Murdick and Wayne Koenig

If you read the November 1986 installment of this column, you know how to use MailMerge for basic mass mailing purposes. But suppose you have a new list of names and addresses (a new data file) to set up. Wouldn't it be nice if you could turn that chore over to your teenage son, or to your niece, or spouse, or secretary, or temporary secretary, or student helper?

The trouble is, you don't always have the time to train someone new, and if the new person knows nothing about computers, it might be less work to just type in the data file yourself.

Fortunately, many CP/M and MS-DOS Kaypros come bundled with a solution: DataStar. (MS-DOS DataStar comes on the first of the two InfoStar disks.)

We're going to show you how to use DataStar to create a program that uses screen prompts to guide a "computer innocent" through the job of creating your mass mailing data file. All the novice will have to do is type in answers to simple questions that appear on the screen—questions like "COMPANY NAME?" (See Figure 1 below.) The novice won't have to worry about details like counting fields or using quotation marks when a field has an internal comma.

Since this is a beginner's column, we will assume that you know little or nothing about DataStar. Just follow the steps below, which describe what you have to do to set things up for your assistant. After that, we'll show you what instructions you should give to that assistant.

The MS-DOS and CP/M versions work almost identically; on the few occasions when separate directions are necessary, we will provide them.

Laying the groundwork

The CP/M and MS-DOS systems start up DataStar slightly differently.

Step 1. CP/M users: Put an operating copy of DataStar in drive A and a blank, formatted disk in drive B and, at the A0> prompt, load the form generation program by typing **formgen**, followed by a **RETURN**.

MS-DOS users: DataStar's form gener-

ation program loads automatically when you put your InfoStar disk in drive A. You should also put a blank, formatted disk in drive B.

Step 2. Now that you've loaded the "form generation" program, you will see a message asking you either to enter a file name for your "form file" or to hit **RETURN**. The form file is the set of questions your assistant will answer in making up the mailing list file. For this example, we will use the file name "NAMES" and we will store it on drive B, so type **b:names** and hit **RETURN**.

MS-DOS users: You have an extra step at this point. After typing "b:names" you are told that it doesn't yet exist, and you

the space bar to move the cursor 11 spaces over (you should see "COL=011" at the top of the screen) and then type **FIRST NAME:** followed by the 30 underline characters.

Step 6. Hit **RETURN** and then, beginning in column 12, type **LAST NAME:** followed by the underline characters and hit **RETURN**.

Beginning in column nine, type **COMPANY NAME:** and the underlines and hit **RETURN**.

Begin in column four for these next two lines: **STREET ADDRESS #1:** and **STREET ADDRESS #2:**. Both of these are followed by the 30 underline characters and a **RETURN**.

FIGURE 1: DataStar Screen Prompts

TITLE (Mr., Ms., Dr.): _____
FIRST NAME: _____
LAST NAME: _____
COMPANY NAME: _____
STREET ADDRESS #1: _____
STREET ADDRESS #2: _____
STATE: _____ Zip _____

are asked whether you want to "create it" or to "re-enter the form name and disk drive?" You should now type **A**.

Step 3. You should be looking at a screen full of text. To obtain a nearly blank screen on which to write your set of questions, type: **^J** (Hold down the CTRL key and type the letter J.)

Step 4. Now you can start typing in the screen prompts. These will eventually be used to create the fields you want. This is a good time to take another glance at Figure 1.

Let's begin with the "TITLE" screen prompt. Type **TITLE (Mr., Ms., Dr.):** and then put 30 underline characters after it.

If you make a typing error, back up (using the backspace key) and overwrite it. For our example, use 30 underline characters for each prompt, unless otherwise indicated.

Step 5. Hit **RETURN** and prepare to type in the next line. For neatness, use

In the next line start in column 17 and type **CITY:** and the underlines, and hit **RETURN**.

Step 7. The last two prompts are different in that they occupy the same line and use a different number of underline characters. Type **STATE:** beginning in column 16 and put two underline characters after it. Then hit the space bar a few times, write **ZIP:**, and put five underline characters after it. It should look like this:

STATE: ____ ZIP: _____

Step 8. Check the screen prompts you have created to make sure there are no errors. Correct mistakes by overwriting. CP/M owners can use the arrow keys to move around; MS-DOS owners must use the control commands indicated at the top of the screen (for example, **^S** to move left one character; **^X** to move down one line).

Step 9. Now you must select one of the prompts as the "key field." A key

Beginner's Luck

field is used for sorting the names and addresses in your mailing list—an interesting process but not relevant to our purpose here. Nevertheless, you must select at least one key field or DataStar refuses to work. So use the arrow keys or control commands to put the cursor on the first underline character of the CITY prompt and type ^K.

When you type ^K, the underline characters will turn into asterisks. The asterisks merely signal that this field is your key field; ignore them.

Step 10. Save and quit by typing ^C and then B.

Your set of screen prompts will be saved under the file name NAMES.DEF on drive B.

Creating a mailing list

Congratulations on mastering DataStar's form generation program.

Now here is what you have to do to use your newly created data file to produce a mailing list. We'll leave it to you to decide how much you should set things

up for your assistant.

Step 1. Start up your computer from a CP/M or MS-DOS system disk. Then remove the system disk and put your operating copy of DataStar in drive A and your disk with your NAMES.DEF data file in drive B. At the A0> or A: prompt, type **DATASTAR** and hit **RETURN**. (Note: Start the computer with a system disk in drive A in order to obtain an A0> prompt.)

Step 2. When asked for a "definition file," type **b:names** and hit **RETURN**.

Step 3. Answer the next two questions about locations for data and index files by typing **B** twice (you are telling DataStar to find and store these files on the disk in drive B).

Step 4. Your screen prompts should now be displayed with the cursor sitting on the first underline character. (If not, hit the space bar to put the cursor on the first underline character.) This might be the right moment for you to get up from the terminal and let your assistant take your place.

Step 5. Type in each piece of information, hitting **RETURN** after each one.

(CP/M users: You won't have to hit **RETURN** after STATE and ZIP because as soon as their underline characters are overwritten, the cursor automatically moves on.)

If there is no information for one of the prompts (for example, no COMPANY NAME), just ignore the prompt by hitting **RETURN**. The cursor will go to the next field.

It is possible to edit if you make a mistake, but that can get tricky. If extra blank spaces get left in the form, those unwanted spaces will end up in the final MailMerge file. In our experience, the best thing to tell assistants is that if they notice a mistake in the middle of typing a record, they should ignore it until the end. We'll deal with editing in the next step.

Step 6. After all the data has been entered, the cursor jumps to the upper right corner of the screen. Check the data. If it is correct, hit **RETURN** to enter it. If there is an error, hit the space bar to return the cursor to the first underline character. Then use the CTRL commands listed at the top of the screen to position the cursor in the field containing the error. Once it is there, use ^G to erase all the data in the field, and retype the entry correctly.

After all the errors have been corrected, hit **RETURN** until the cursor is once again in the upper right corner of the screen, and then hit **RETURN** again to enter the corrected record.

Step 7. When all the names and addresses have been entered, save and quit by typing ^EE, then hit **RETURN** followed by a ^C.

In conclusion

You will now have three files on your disk in drive B: NAMES.DEF, your set of screen prompts; NAMES.NDX, your index file for all the cities; and NAMES.DTA, your data file, ready to be used.

The DTA file is the one you would name as the file to be used by MailMerge to produce a mailing list, form letters, etc. If you were using our example above, the MailMerge dot command would be .DF NAMES.DTA. This means "use the Data File called NAMES.DTA to produce . . ."

Now, compliment your assistant on a job well done!



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
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by Marshall L. Moseley

MicroPro updates

I wrote a letter to MicroPro about updates for the software I received with the Kaypro PC I purchased. Under the license agreement I signed, MicroPro could, at their option, offer upgrades to the customer.

MicroPro said that Kaypro had produced the software under contract and that Kaypro was responsible for offering updated versions. How do I go about requesting the latest versions of the software that came with my Kaypro PC?

Banner C. Segraves III
Dover, Delaware

Koypro Corporation has no commitment to provide updated software. In fact, by license with MicroPro, Koypro may only distribute WordStar with computers.

In the past it has been very difficult for Koypro owners to get updated versions of WordStar. Fortunately, MicroPro recently reached an agreement with Riva Software of San Francisco that allows Riva to sell updates of WordStar and WordStar Professional. For more information call Riva Software at (415) 382-1080.

Stop that racket

I have a Kaypro PC that I like very much, except for the noise made by the fan. Is there a way to reduce it?

James D. Leach
Rapid City, South Dakota

Yes, there is, but first a warning: Do not disconnect or modify the fan inside your Kaypro. Its function is to keep the computer's internal circuitry cool. If the fan stops functioning or is restricted in any way, your computer could overheat and be irreparably damaged.

The best way to muffle the sound from the fan is to place something between you and the computer's system unit. At home I have placed my PC 10 on its side on the floor next to my desk, while the monitor and keyboard remain on top. Not only do I have two feet or so of wood, air and paper between me and the fan, I also have a lot more room on my desk.

Time-stamping files

I start up my dBASE with DO CLOCK from the article "dBASE II and the Real-time Clock" (PROFILES, April 1985). It works almost as expected, creating nicely formatted date strings. But it doesn't time stamp files, and it stores the internal clock time in a memory variable named DATE instead of in the system variable DATE(). What is the fix? I am running dBASE II version 2.41 under CP/M 2.2F.

Thomas L. Adams
Yanbu Al Sinayah, Saudi Arabia

There is no fix. CP/M 2.2 does not support time and date stamping in its files, and DATE() is reserved by the dBASE system — its format cannot be changed. There is a work-around, though, if you don't mind doing a little programming.

Try writing a dBASE II program that creates a string variable containing the data base file name and the time and date of the alteration whenever a data base file is EDITed, BROWSEd or APPENDed. Then, at the end of the work session, run another program that SAVES these variables to disk. The next time you run your program, RESTORE the memory variable file and you will know when your data base files were last altered. See the sections on the SAVE and RESTORE commands in your dBASE manual.

Video confusion

I need some additional information concerning Don and Sharyn Conkey's letter in the September 1986 "Tip Trader."

The letter suggested that a video blanking ROM chip for the Kaypro 4'83 was available and could be purchased from Advent Products, Inc., for \$19.95 plus \$2 shipping and handling. When I called Advent and asked them about the video blanking ROM, I was told that it worked only with the Advent TurboROM, which costs \$79.95. This means an outlay of \$100, rather than \$20.

Do I have to buy the TurboROM from Advent to install the video blanking ROM?

Jonathan D. Miller
Kirkwood, Missouri

Unfortunately, yes. Advent Products informs me that the video blanking ROM referred to in September is designed to work with their TurboROM only. I apologize for any inconvenience the omission of this information may have caused.

Bad sector blues

What is a bad sector, and what causes it? Not too long after getting my Kaypro 10, and after running into a problem, I used the public domain program FIND-BAD54, which located my problem and locked out 24 kilobytes as a bad sector. I had visions of losing 24K week by week until I had no space left. Fortunately, I have not experienced another bad sector yet, but I am curious.

Harlan P. Wolfe
Batavia, Ohio

Your hard disk is magnetically divided into tracks, each of which contains sectors. These divisions exist so that information can be read from and written to the disk.

A bad sector is one that cannot be read from or written to by the computer. It is either physically damaged (this is called a "hard error") or it has been written to the disk incorrectly (this is a "soft error," which can sometimes be repaired).

The manufacture of hard disks is an exacting procedure — errors always creep in, taking the form of bad sectors. When Kaypro technicians installed your hard disk, they ran a diagnostic program that discovered these sectors and permanently stopped the computer from reading or writing to them.

Unfortunately, some bad sectors slip by the diagnostics. The computer's operating environment (the temperature or humidity) can affect your disk and bring out latent bad sectors. Sometimes bumping or dropping the computer can create new bad sectors.

MS-DOS users: There are two programs available that find and neutralize bad sectors: FORMAT.COM and RECOVER.COM.

ER.COM.

FORMAT is used to prepare a disk to receive information. As it runs, it automatically locates bad sectors and does not allow data to be written to or read from those areas.

RECOVER reads either a single file or the files on an entire disk. It locates any bad sectors that are part of a file and "locks them out"—tells the computer not to read or write to them. If you have a large text file containing a bad sector, for example, you can get back most of it using RECOVER.COM. This is not as good as it sounds because most programs—spreadsheets, data bases, etc.—rely on complete file integrity in order to function at all. So you may RECOVER a data file, but because a portion of it is missing (the portion that was in the bad sector), your program will refuse to read it.

CP/M users: If you suspect your hard disk has bad sectors (the message "BDOS ERR ON A: BAD SECTOR" is a good clue), then run FINDBAD.COM, which was shipped with Kaypro 10s and is also available in the public domain. If the problem recurs or is cumulative (every day you get more), your hard disk may be bad and may have to be replaced.

Soft (bad sector) errors can sometimes be eliminated by reformatting the disk in question. In fact, the only way I know of to find out if a bad sector is soft or hard is to reformat the disk. If the bad sector disappears, it was a magnetic (soft) defect, not a physical (hard) one.

Screen dump software

I recently purchased a public domain disk that contained a screen dump utility. The program was supposed to provide a printout of whatever was on my current screen. It didn't work! A call to the vendor revealed that the program does not work with the 2.2u ROM. I really do need a working screen dump utility. Do you have any suggestions?

Jack Foster
Prescott, Arizona

Robert Greenlee of Xpert Software in San Diego, California, assures me that Xpert's screen dump program XSCREEN works quite well with the 2.2u ROM. XSCREEN also saves screens as text files so you can edit them or include them in other docu-

ments. For information call Xpert Software at (619) 268-0112.

A menu query

I recently purchased a Kaypro 2X after owning a Kaypro 2'83. I am as pleased with the 2X as I was with the 2'83. I have a question, though: Does the Master Menu program take up RAM while a program is running, or does it cancel itself out?

Alan A. Arkema
Bozeman, Montana

Master Menu does not use RAM while another program is running, but I'll let you in on a little secret: Master Menu is a SUBMIT file generator. When you invoke a menu option, Master Menu creates a temporary submit file named \$\$\$SUB that contains a command to re-invoke Master Menu. Then Master Menu runs the program you requested. At this point Master Menu ceases to run and all memory is devoted to your program.

Once the program is done, the computer returns to CP/M. CP/M warm boots and automatically looks for a file named \$\$\$SUB. If it finds it, CP/M reads the commands contained within and executes them, simultaneously erasing \$\$\$SUB. In this case the submit file runs Master Menu, returning you to the program at the point where you left it.

If you are going to try using \$\$\$SUB, keep these rules in mind: Multiple commands must be in reverse order, from bottom to top; each line must contain 128 characters—pad the line with spaces if you have to; and remember that a carriage return and line feed (which is what you get when you press RETURN) are two characters.

CP/M and MS-DOS

I have a Kaypro 16. Why is it that in your "Letters" column it is never mentioned? I see a lot of questions from people who have Kaypro 4s and 2Xs. What are the differences in these computers?

Barbara T. Conner
Alexandria, Virginia

To understand the differences between a

Kaypro 16 and, for example, a Kaypro 10, you should first have a clear idea of what an operating system is, and what its relationship to your computer is.

The operating system is your computer's housekeeper. It takes care of all the sundry details necessary to run a computer. It operates the screen and the disk drives and manages memory so that applications software (word processors, spreadsheets, etc.) can function properly.

An operating system has two parts. First, there is the program that runs when you start your computer, called the CCP—the command console processor. This program contains the most frequently used operating system commands. Commands to rename, copy, and delete files, for example, are part of the CCP. Because the commands are in memory and available whenever you see a system prompt, they are called internal commands.

The second part of the operating system consists of a series of utility programs stored on disk. These programs allow you to perform some of the more complex computing tasks (such as copying an entire disk), and some of the least used tasks (such as setting the serial baud rate). Operating system commands stored on disk are called external commands.

Kaypro Corporation makes two types of computers: ones that use the CP/M operating system and ones that use the MS-DOS operating system. These operating systems are completely different; programs written for CP/M will not run under MS-DOS, and vice versa.

CP/M, created by Digital Research, is the older of the two systems. It's used in the Kaypro 1, 2'83, 4'83, 4'84, New 2, 2X, 10, and Robie. CP/M uses 64K of random access memory (RAM) and has limited graphics ability.

MS-DOS is an acronym for Microsoft Disk Operating System. It was designed to imitate IBM's PC-DOS as closely as possible. Since Microsoft wrote PC-DOS for IBM, this is not a problem; just about any software that runs on an IBM PC will run on a MS-DOS computer.

MS-DOS uses up to 640K of RAM, and can do very complex graphics using color or monochrome monitors. Most software written today is for MS-DOS.

The Kaypro MS-DOS computers are the Kaypro PC, PC-10, 16, 16E, 16/2, 16/2E, 2000, and 286i (models A, B, C, and D). ■

User Groups

Learning to operate a computer is not easy—everyone needs help at one time or another. This is precisely the reason why user groups were born.

Basically, a user group is a collection of computer owners and users who learn from each other. These are non-profit membership organizations devoted to making life with a computer easier.

Almost every computer brand and operating system has user groups that support it; many groups are a mixed bag. For example, owners of many different brands of computers find they all use the same operating system, and therefore, have some common ground.

Most user groups have members with a wide range of expertise and experience—from absolute beginners to those who have “working” knowledge to people who are “power users.” Often people’s expertise breaks down into types of software applications—word processing, data base managers, spreadsheets, telecommunications, etc. Perhaps more often, a member’s knowledge is specific to a particular piece of application software.

The bottom line is that user groups are a veritable goldmine—and the mother lode is information.

KUGs

For those readers who own Kaypro computers, Kaypro User Groups (KUGs) exist in every state, in Canada, and in countries all over the world. To find the KUG closest to you, write to Fred Zuill, KUG Manager, at Kaypro Corporation, 533 Stevens Avenue, Solana Beach, CA 92075; (619) 481-4368 (voice). Be sure to include your zip code.

Fred Zuill also maintains a BBS—the KUG ROS—for the exchange of information and help. It contains a message section, as well as lots of public domain software for both the CP/M and DOS operating systems. Public domain programs mentioned in *PROFILES* can also be found there. The system is online 24/hrs, 7 days a week, and can run at 300/1200/2400 baud.

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Technical Forum

Direct screen I/O

by Tom Enright

Last month we took an initial look at the benefits of direct screen I/O versus using the I/O routines provided by DOS. Two assembly language programs were included to demonstrate the differences between the two approaches to screen I/O.

The first program (SCRNI.ASM) used the "print string" service call of DOS to clear the screen, print 24 lines of Xs, and repeat ten times. The second program (SCRND.ASM) does the same thing directly to video memory. The net result is that, after assembly and linking, the second program runs approximately 50 times faster than the first program.

Both programs are available on Kaypro's KUG ROS BBS in the archive file SCRNTTEST.ARC. Both source code and assembled versions are included in SCRNTTEST.ARC. This month we will take a closer look at both programs to see how they work. A basic familiarity with 8088 assembly language is assumed for the purposes of this discussion.

Standard screen output

The first program, SCRNI, doesn't use anything tricky or creative. Almost any book on IBM PC assembly language will give you detailed information on the operations this program uses. (The books I like are *IBM PC & XT Assembly Language*, by Leo Scanlon; *Assembly Language Primer for the IBM PC & XT*, by Robert Lafore; and *Programmers' Guide to the IBM PC*, by Peter Norton. All are excellent assembly language tutorials.)

The only part of SCRNI worthy of further discussion is the line "loop tloop." LOOP is a special 8088 instruction that is analogous to a FOR..NEXT loop. It subtracts one from the iteration count in the CX register, jumps to a specified label (tloop) if the count is not zero, or goes to the next instruction if the CX contains zero. In our case the next instruction is "int 20h"—this ends the program and returns us to DOS.

SCRNI performs its operations in full compliance with recommended programming practices. The only problem is that these practices result in rather slow screen I/O.

Video RAM

Putting characters directly into video RAM is a little more complex than letting DOS do it for us. For one thing, video memory starts at different addresses, depending on what video card you are using. Also, video memory, in text mode, uses two bytes for each character displayed on the screen. The first byte is the attribute and the second byte is the character.

The attribute byte controls how a character appears on your screen. Monochrome attributes are normal, underlined, blinking, reverse video, and high-intensity. CGA attributes define character color, background color, and whether or not the character blinks. For both of our programs we use

program to output any printable characters, including graphics characters—not just the Xs used in this example program.

The program code itself is in three modules: the mainline, a subroutine to clear the screen, and a subroutine that puts characters into video memory. The clear screen operation is implemented as a subroutine because we will be using it from more than one place in the program. The mainline module sets up the loop counter, calls the clear screen module, calls the print screen module, and repeats if the total number of repetitions is less than ten. When ten repetitions have been performed, the mainline module calls the clear screen routine again and ends.

*It's more difficult to
program direct video I/O,
but the increase in
speed is impressive.*

the attribute 07h. With a monochrome card and monitor, this means normal (green on black) characters. With a CGA card, the 07h attribute means gray characters on a black background.

SCRND overview

In SCRND our task becomes a little more complex than simply selecting attributes. SCRND prints 1,920 Xs to the screen, just like SCRNI, but does so at a lower level. Most operations that SCRNI allows DOS to take care of must be explicitly programmed in SCRND.

SCRND begins with the very same assembler directives used in SCRNI. The first difference is the data definition statement for the 1,920 Xs. Notice that in SCRND we mark the end of the string with a zero byte instead of the "\$" used in SCRNI. By using an ASCIIZ string (a series of ASCII characters terminated by 00h), you can use the routines in this

Character insertion details

The INSTR module does most of the work in this program. It performs three basic operations: figuring out what video mode is currently active (which tells us where video RAM begins); figuring the offset into video RAM for the next character; and inserting that character, along with its attribute byte, into video memory.

Since we are printing an entire screen at a time, we set the initial offset into video RAM to zero. This value is stored in the DI (Destination Index register). Also, we will be using a normal video attribute, so we put the value 07h into DH. Next, we put the starting address of the string we are going to print in the SI (Source Index register). This series of operations sets up most of the addresses needed to print our string into video RAM.

The only major address left to find is the beginning of video RAM. The start-

ing point of video memory depends on which video mode is currently active. One of the options with INT 10h is to query the current video mode. If we put the value 0Fh into the AH and execute INTerrupt 10h, DOS 2.0 or newer will return a code for the current video mode in the AL register. For our purposes we will assume only two possible video modes: 80-column monochrome text or 80-column color text.

We can streamline our program further by comparing the code returned in AL only to the code for monochrome text. If AL contains the code for monochrome, then video RAM begins at B000h. If it contains anything else, we assume 80-column color text, which begins at B800h. (It is possible to get into trouble making these kinds of assumptions, but since most owners of IBM compatible computers run either a monochrome or CGA video card, these assumptions are usually valid.) Whichever address matches with our elimination procedure is moved into the ES (Extra Segment) register, and we are ready to go.

Since we are ready to begin putting characters on the screen, a quick recap is in order. We have the ES pointing to the start of video memory, the DI pointing to the part of video RAM we will use first, the video attribute waiting in the DH, and the SI pointing to the first character to insert.

The way in which the ES and DI registers work while inserting characters is worth a little more explanation. In our program they work as a pair to specify a precise address. The ES points to the beginning of video memory and is called a "segment address." The DI holds the offset from the segment address that characters will be inserted. The address in the DI is added to the address in the ES to determine the destination address.

At the label "ins2" we move the first character (byte) we want to print into the DL register. We compare the contents of the DL with zero to find out if we are at the end of the string. If the DL contains zero, we bypass the rest of INSTR and return to the mainline. If the DL does not contain zero, we continue inserting characters.

Since the attribute byte is already in the DH, and we already moved the character to print to the DL, we can now move the entire DX register (the DH and

DL together make up the DX) directly into video RAM. The ES:DI combination points to the spot in video RAM that we want, so it is a simple word-length move.

Once the character is on the screen we can set up for the next character. We add two to the value in the DI so that it now points to the next location in video RAM that we will use. And we add one to the SI so that it points to the next character we want to insert.

At this point the program simply jumps back to the label "ins2" and repeats until a value of 00h is moved into the DL. When that happens, the program jumps to "insx", which restores the ES and returns to the mainline.

The mainline retrieves the iteration count from the stack and uses the same "LOOP" statement that SCRNI used to check and maintain the count. When the value restored from the stack is one, the LOOP statement decrements that value to zero and passes control to the next statement. The next statements are a call

to the clear screen routine and an INTerrupt 20h to terminate the program and return to DOS.

Conclusions

The above explanation, although brief, should give you an idea of how direct video I/O can speed up your programs. It's more difficult to program direct video I/O than to let DOS do the work, but the increase in speed is impressive. Instead of being able to see each line being painted on the screen, an entire screen of information seems to simply materialize instantly before your eyes.

Next month we'll discuss a modification to INSTR to make it more generally useful in assembly language programs (specifically, turning it into two subroutines—one that finds the start of video RAM and another that inserts characters at a specified row and column position). Space permitting, we will also show you how to take advantage of direct screen I/O in a language like Turbo Pascal.

†

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Addenda
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Tip Trader

edited by Marshall L. Moseley

If you have a tip you'd like to share with other readers, please send it to Marshall Moseley, "Tip Trader" editor, *PROFILES Magazine*, 533 Stevens Avenue, Solana Beach, CA 92075.

This month my own tips for you include a little-known feature of WordStar and instructions on how to modify any 360K floppy drive so it will work in a Kaypro 286i.

The power of ^P

Many WordStar users think of ^P simply as the key sequence that takes them to the Print Menu, thus enabling them to underline or boldface their text. While this is true, ^P actually tells WordStar "embed the next character typed in the text, regardless of what that character is."

Being able to embed any character in a text file can come in handy. It allows you to send very complex control commands to your screen or your printer. For example, to write a batch file that makes your computer beep, open a non-document file (N from the Main Menu) called BEEP.BAT, then type **ECHO ^P^G**, and press **ENTER**. (^G is the ASCII code that sounds the beep.) Use **^K^X** to save the file and exit WordStar. Then type **BEEP** and press **ENTER**. Your computer will beep.

If you use CP/M, simply name the file BEEP and leave out ECHO. Then, at the CP/M system prompt, type **TYPE BEEP** and press **RETURN**.

Many printers have special codes, beginning with ESC, that change fonts, character pitch, etc. Unfortunately, most word processors will not accept ESC as a typed character. WordStar does, if you use ^P. For example, if the printer code to change fonts is ESC 3, from WordStar type **^P<ESC>^P^C** (where you see <ESC> press the ESC key). Why ^C? Because ^C is the key-stroke value for a decimal 3 (look at an ASCII chart and you'll see what I mean).

MS-DOS users can place codes in a batch file and ECHO them to LPT1: (MS-DOS's name for a printer). CP/M users can PIP them to LST: (CP/M's name for a

printer). With either system, make sure the printer is online before you send it a code.

Driving a 286i

The Kaypro 286i is designed to use two types of floppy disk drives: a 1.2 megabyte drive and a special kind of 360 kilobyte drive. This special 360K drive is more expensive than other 360K drives. You don't have to buy this drive, though; with a bit of masking tape you can make any double-sided, double-density floppy disk drive work in a 286i.

Before installing the 360K drive, place it in front of you with the front panel facing away from you and the card edge connector at the rear of the drive closest to you. On the top and bottom of the card edge connector are 34 copper rectangles (called pins) that carry signals from the drive to the computer, and vice versa. Using a small sliver of masking tape, cover pin 34, which is the pin farthest to the right on top of the connector. Make sure that the pin is completely covered and that the tape is firmly in place. Now install the drive as you normally would.

The programmer who told me about this said that although the drive would read and write to disks with no problems, it would not be able to format them. Naturally, that was the first thing I tried to do, and it worked! Go figure it.

A few caveats: these are instructions on how to install a "non-standard" device in your computer. Such installation voids your warranty, and there is no guarantee that the drive will work with your software. I have never heard of any problems stemming from this procedure—I have a taped Toshiba 360K drive in my 286i-C and it works just fine with everything I've tried—but be aware that no software or computer company makes any promises concerning a drive adjusted in this manner.

SUBST revisited

In the December/January *PROFILES* I described the SUBST command, which allows you to create virtual drives corresponding to path names. The problem is that some people ran out of drives. MS-DOS 3.2, by default, allows drive names

A through E only. With drives A, B and C used by the system, there are only two drive names left.

You can designate up to 26 drive names (A-Z) using the CONFIG.SYS command LASTDRIVE=X. CONFIG.SYS is a text file containing system information. Upon starting, MS-DOS reads the commands in CONFIG.SYS (which must be in the root directory) and configures itself accordingly.

Add the line **LASTDRIVE=X** to your CONFIG.SYS file (if you don't have a CONFIG.SYS file you can create one using WordStar's non-document mode). Make X any letter from A to Z. This allows you to create as many virtual drives as you need.

A keycap fix

In "Beginner's Luck" in the October 1986 *PROFILES*, John Sandell mentions that computer users often encounter broken keycaps. I had a similar problem with my Kaypro 4 and fixed it using a small amount of instant glue (commonly called Krazy Glue™).

Just apply a small amount of the glue to the keycap, then position it on the stub from which it broke off. Be very careful not to let any glue run over the side of the stub; I blotted the excess glue off the underside of the keycap before I placed it in position.

This procedure took me only a few minutes and resulted in a repair that has held ever since.

Bernard T. Bell
Lennox, Massachusetts

A pseudo-tractor feed

Roger Culbertson of Hollywood, California, felt tricked because his Juki printer had tracking problems with continuous-feed paper and his dealer had not explained that he might need a tractor ("Q & A," August 1986).

I have a Kaypro II at work and a Kaypro 4 at home, each with its own Juki printer. Neither has a tractor feed.

I found that by shifting the rubber rollers on the crossbar I was able to control the paper being pulled off center. Try placing both rollers near the left margin, separated by about one inch.

Experiment. If nothing else works, print five pages at a time and stop to replace the paper. It's no big deal and a lot less expensive than a tractor feed. I have my Juki tuned to the extent that it can print 100 pages without stopping.

Stephen A. Sheppard
San Diego, California

Patching Turbo

This patch for the CP/M versions of Turbo Pascal 3.0 and 3.01 automatically answers yes or no to the initial "Load error messages?" prompt. This comes in handy when using a SUBMIT file. The patch for version 3.0 was suggested by D.K. Smith in the June-July 1986 issue of *Micro Cornucopia*.

Begin with DDT.COM and TURBO.COM on the same disk (never patch your master or working copy—make any changes on a test disk first). Type **DDT TURBO.COM**. (Ed. note: This information is intended for those experienced at patching. For complete information on how to patch a program, see "The ABCs of DDT" in the February 1987 *PROFILES*. The following patches have not been tested by *PROFILES* technical editors.)

To automatically load the error messages:

Version 3.0

At Address	Change	To
222C	CD	AF
222D	21	3D
222E	2D	00

Version 3.01

At Address	Change	To
220B	CD	AF
220C	00	3D
220D	2D	00

To automatically not load the error messages:

Version 3.0

At Address	Change	To
222C	CD	AF
222D	21	00
222E	2D	00

Version 3.01

At Address	Change	To
220B	CD	AF
220C	00	00
220D	2D	00

When finished, exit DDT with a ^C, then type **SAVE 121 TURBOX.COM**. Rename the file to TURBO.COM after you try using it.

Charles E. Kichler
Manhattan, Kansas

Perfect Writer references

The NOTE technique for citing references in Perfect Writer (*PROFILES*, October 1986) works, but there is an easier way, using numeric variables set with @SET and printed with @REF. For example, list your references like this:

@SET[#+=+1]@REF[#].

@SET[lockwood=#]Lockwood, Ralph. A Guide to California's Trees, Acme Press, 1986.

In this example @SET[#+=+1] increments the # variable. @REF[#] prints its value. [lockwood=#] sets the "lockwood" variable to this value.

Now you can place the author's name variable—@+[@REF(lockwood)]—in your text as needed and the reference number will appear in the printed text.

Place your reference list before the body of your text. Precede and follow your reference list with @SET[page=nn] and @SET[page=0], respectively. Replace nn with the last page number of your text. You can now add or delete references or change their order with ease.

Jim Ziesfein
New York, New York

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RATFOR Add IF/THEN/ELSE & character variables to Microsoft FORTRAN for CP/M \$29.95

TURBO PASCAL from Borland is an excellent implementation of PASCAL

CP/M \$59.95; MSDOS \$79.95

TOOLWORKS C This C compiler from Software Toolworks was rated highly by both BYTE and Microsystems magazines. \$49.95 MATHPAK option for floats and longs \$29.95 CP/M of MSDOS; sorry no double or bit fields.

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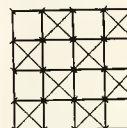
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New Products

edited by Suzanne Kesling

The following new product listings are not reviews and should not be considered endorsements. To be considered for publication in this column, press releases should be sent to Suzanne Kesling, "New Products" Editor, c/o PROFILES Magazine, 533 Stevens Ave., Solana Beach, CA 92075. Releases must state prices and on which Kaypro models products run. Include black and white photos if available.

Create your own font

Alphabets is a font generation program that allows you to create thousands of fonts as well as electronic signatures and logos. It contains different typefaces and type sizes that enable you to create customized fonts for newsletters, brochures, and a variety of other documents.

The four basic typefaces included are: Vonillo, a clean, sans serif font; Pretty, a medium serif font; Swirl, a script-like font; and Olde, an Old English style font. These styles range in size from six to 48 points.

Alphabets provides a what-you-see-is-what-you-get (WYSIWYG) screen display, allowing you to print exactly what you see on screen. The program also includes an editor icon for creating and modifying custom graphics.

\$195. DOS systems. Xerox Corporation, Stamford CT 06904; (213) 333-9127.

Sheet feeders

The PaperPro 33-series cut-sheet paper feeders are lightweight, single-bin feeders that clip onto a number of popular printers. No mounting bracket, special software, or printer PROM are needed, and the automatic feed mechanism provides precise first-line positioning.

These feeders can be used with sheets between 5 and 11-3/4 inches wide in portrait (vertical) mode, and between 8-1/4 and 11-3/4 inches in landscape (horizontal) mode. The paper bin holds

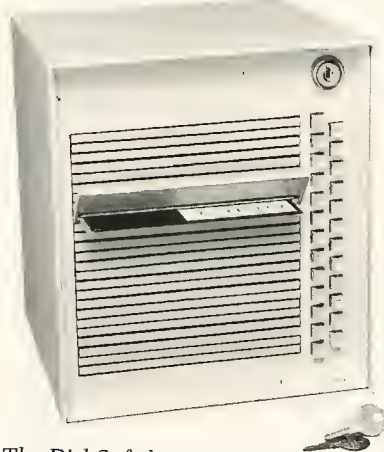
up to 80 sheets—no paper cassette is required.

A slot allows manual insertion of single sheets or envelopes without interrupting the paper supply.

Prices range from \$275 to \$315. Rutishouser of America, Inc., 10345 Brockwood Rd., Dallas, TX 75238; (800) 232-5821.

Lock 'em up

The DiskSafe is a security and management system for storing floppy disks. Similar to a small file cabinet in construction, it contains 25 high-impact styrene envelopes that completely enclose the disks.



The DiskSafe has two mounting alternatives: rubberized feet for free-standing installation, or a steel mounting plate that allows you to lock the safe to your workstation, thus providing additional security.

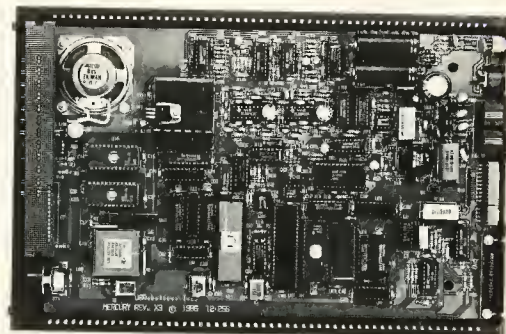
\$99.95. Disketech, 3520 Investment Ln., Suite 5, Riviera Beach, FL 33404; (305) 848-7005.

9600 baud modem

The Courier HST (High Speed Technology) modem is designed for use on voice-grade telephone circuits and provides full-duplex 9600 bps data communication through an asymmetric frequency division of the telephone channel.

The Courier HST transmits at speeds up to 1,100 characters a second over local and long-distance lines, using a

proprietary error- and flow-control protocol.



The modem uses 32-state Trellis Coded Modulation, which enables it to achieve maximum speed over a wide range of dial-up line conditions.

\$995. USRobotics, Inc., 8100 North McCormick Blvd., Skokie, IL 60076; (800) 342-5877.

EGA board

The EGA WONDER color graphics card allows EGA software to be displayed on any IBM-compatible PC monitor. The EGA WONDER runs EGA, CGA, MDA, and Hercules software on EGA, RGB, TTL and Composite monitors, maintaining downward compatibility to existing software.

The EGA WONDER allows users to display existing CGA software on their EGA monitors, with high resolution 8 x 14 text and double scanned CGA graphics.

The board has built-in Automatic Mode Switching, enabling it to sense and automatically switch between EGA and CGA color modes or between EGA, MDA and Hercules monochrome modes.

\$399. DOS systems. ATI Technologies Inc., 450 Esno Park Dr., Markham, Ontario, Canada L3H 1H5; (416) 477-8804.

Static control

DotaLife 48 TPI minidisks now have liners that guard your disk against possible data loss or damage caused by static electricity.

The human hand can transmit over 1,500

New Products

volt charge of static electricity—a charge of 1,300 volts is sufficient to flaw the media surface of a disk.



The DataHold disk liner is treated with an anti-static agent that uniformly disperses any electrostatic charge. The DataHold liner disperses static in under .08 seconds, reducing the potential for data loss.

\$25.50 for package of ten DSDD disks. Verbatim Corp., 323 Soquel Way, Sunnyvale, CA 94086; (800) 538-1793.

File utility

File Genie is a utility that allows you to dissect and analyze files. You can operate on structured data files without destroying their structure.

Genie Language, included in the package, allows you to write scripts for repetitious tasks, such as converting WordStar files to WordPerfect files and back again or automatically embedding the codes for typesetting.

The program also includes a search-and-replace utility that allows you to search for any ASCII code.

\$69.95. DOS systems. Team Austin, Inc., 6809 Convoy Ct., San Diego, CA 92111; (800) 822-0852; in CA (800) 822-0853.

The expert

VP-Expert is a rule-based expert system

development tool that includes all of the features common to most small and medium sized tools. It has an inductive front end that can create rules from information read from data in external files.

VP-Expert also has the ability to access data base files created by other programs such as VP-Info and dBASE, and spreadsheets created using VP-Planner or Lotus 1-2-3.

\$99.95 plus shipping and handling. DOS systems. Paperback Software, 2830 Ninth St., Berkeley, CA 94710; (415) 644-2116.

Cordless mouse

The cordless Manager Mouse takes advantage of the same infrared technology that has been used in cordless television remote controls for years.

Like the rest of the Manager Mouse line, the cordless unit has a maintenance-free design using two small wheels that eliminate the need for a ball in the mouse. A patented suspension system provides positive traction on a variety of surfaces and at any angle without any need for a special tablet.



It is effective up to eight feet from the receiver, operates up to ten hours on a single charge, and is still functional at a 45 degree angle.

The mouse automatically switches into a power-saver mode when it is not in use for more than 60 seconds and

restarts when use is resumed.

\$229. Includes a receiver/charger. DOS systems. Torrington Co., 59 Field St., Torrington, CT 06790; (800) 654-5449.

Daisywheel printer

The Juki 6500 is a quiet (58 dbA) letter-quality printer with a maximum speed of 60 cps. It offers 10/12/15 pitch and proportional spacing.

Printing features include underlining, shadowing, and graphics capability. The 6500 also features a Stepper belt-driver motor for accurate positioning and a MTBF rate of 4,000 hours at a 25 percent duty cycle.



The 6500 weighs 37 pounds, has a 16-inch platen, and is equipped with both a Centronics parallel and a RS-232C serial interface.

\$1,395. Juki Office Machine Corp., 20437 S. Western Ave., Torrance, CA 90501; (800) 325-6134, in CA (800) 423-6315.

Help for special educators

Goals and Objectives helps educators, of the handicapped children and adults, manage paperwork and make decisions for effective instruction.

After the student information is entered, the instructor then selects goals and objectives from one of the two available curriculums.

WSCC (Washington State Cooperative Curriculum) has 285 goals and 20,717 objectives. It is recommended for students that are developmentally less than six years of age.

CAMEO (Computer-Assisted Management of Educational Objectives) has 163

goals and 6,672 objectives. It is for students that are developmentally older than five years, concentrating on the first through 12th grade.

The program allows you to print history reports, behavior charts, and data sheets for classroom use.

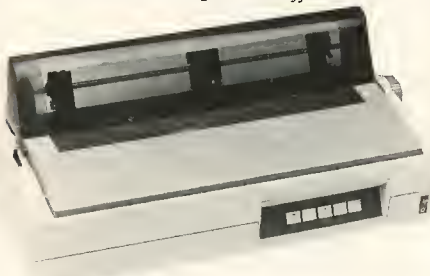
\$875 with both CAMEO and WSCC, \$695 with either CAMEO or WSCC. CP/M and DOS systems. Jeff Stewart, 18518 Kenlake Pl., N.E., Seattle, WA 98155; (206) 486-4510.

Business printer

The ProWriter C-815 Supro is a 24-pin printer that uses a diamond-shaped printhead to achieve its speed and low noise level.

The printer reaches speeds of 162 cps (12 cpi) in letter-quality mode, while measuring 51 dBA in quiet mode. And in draft mode speeds up to 400 cps can be reached at less than 53 dBA.

All functions are located on the front panel, including a clear buffer function, which erases buffer memory without having to turn the printer off and on.



Bidirectional graphics are also possible by setting a function that aligns the pins for high throughput and accuracy—graphic resolution is 180 x 360 dpi. Character fonts include Courier 10, Prestige 12, Draft/Condensed, and Super-Subscript.

\$1,995. C. Itoh Digital Products, Inc., 19750 South Vermont Ave., Suite 220, Torrance, CA 90502; (213) 327-2110.

Application generator

Magic PC allows you to create business applications without any programming language.

To implement an application with Magic PC you fill out Execution Tables and Information Banks, then interface these tables by highlighting a selection from pop-up menu-driven windows. Each entry in the Execution Table is an operation, which manipulates data in a true relational database environment. Once the tables are filled in, the program will orchestrate the information into one file.



Magic PC also offers a zooming capability that allows you to display multiple Magic programs or external online programs. The three dimensional effect of window zooming lets the user probe into the application and exploit the data underneath.

\$695. DOS systems 2.0 or higher. Aker Corporation, 18007 Skypark Circle Dr., Suite B2, Irvine, CA 92714; (714) 250-1718.

LED printer

PAGE PRINTER II uses NEC LED-based technology rather than the conventional laser engine to accomplish a print quality of the laser type.

This printer features 1.5 megabytes of RAM, full-page bit-mapped graphics, HPGL 7475A Graphics Plotter emulation, and HP LaserJet emulation.

The printer has a rating of eight pages per minute, 5,000 copies per month, and a print life of 300,000 pages. It also features 300 x 300 dpi, a standard 250-sheet input hopper and a 250-sheet output stacker.

\$3,995. Koypro Corporation, 533 Stevens Ave., Solano Beach, CA 92075; (619) 481-4300.

Product Updates

PRO Mail, version 5.0, now includes longer field lengths—up to 20 spaces each for first and last names. The new version also enables you to move from menu to menu without going through the main menu. Hurd Computer Systems, Cypress, CA ☐ **WordStar** and **WordStar Professional** owners can now update their software for a small price thanks to an agreement reached between Riva and MicroPro. Call (415) 382-1080 for more information. Riva Software, San Francisco, CA ☐ **TechWriter**, version 3.0, offers improved printer and keyboard support, faster screen support, password file protection, and the new optional Font Maker, which allows you to create and print custom character sets. CMI Software, Waltham, MA ☐ **FormTool**, version 2.0, includes a new data merge capability, additional fonts, and more powerful word processing, including word-wrap, reformatting, justification, and also centering. Bloc Development Corp., Miami Beach, FL ☐ **Finally! Modules** is an add-on product for the subroutine library Finally! and is for use with compiled BASIC programs. It includes pull-down windows, horizontal menus with explanatory text, a pop-up help screen system, and more. Komputerwerk, Pittsburgh, PA ☐ Enhancements to the **MultiMux** multiplexer line include an internal 1200 bps "Command Modem" for remote network control, expanded operational statistics, and auto-reporting features. Multi-Tech Systems, New Brighton, MN ☐ New features of the **Smartmodem 2400** and **2400B** provide easy access to modem configuration settings and increase stored phone number capacity. Hayes Microcomputer Products, Atlanta, GA ☐ **GURU**, version 1.1, has enhanced system capabilities that allows users to process KnowledgeMan/2, dBASE III and dBASE III Plus files as though they were GURU tables. Micro Data Base Systems, Lafayette, IN ☐

Product Updates provides information about revisions of existing products. Users should contact vendors for more complete information and current prices.

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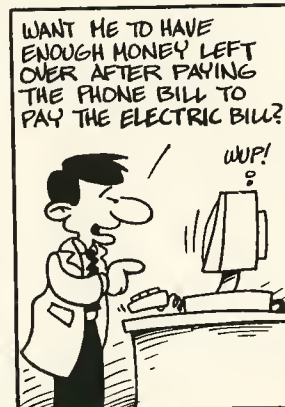
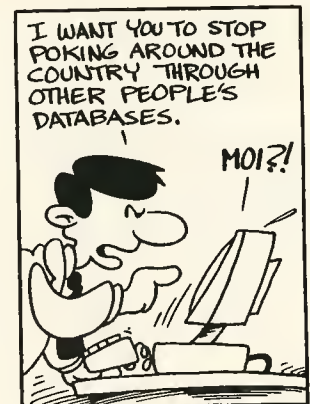
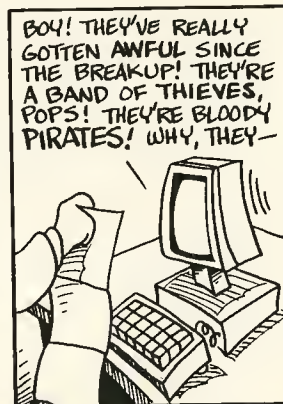
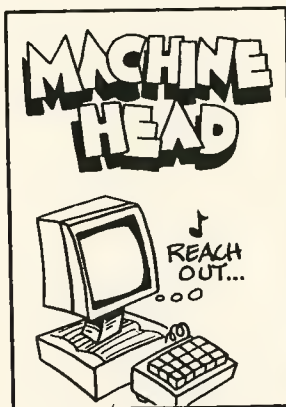
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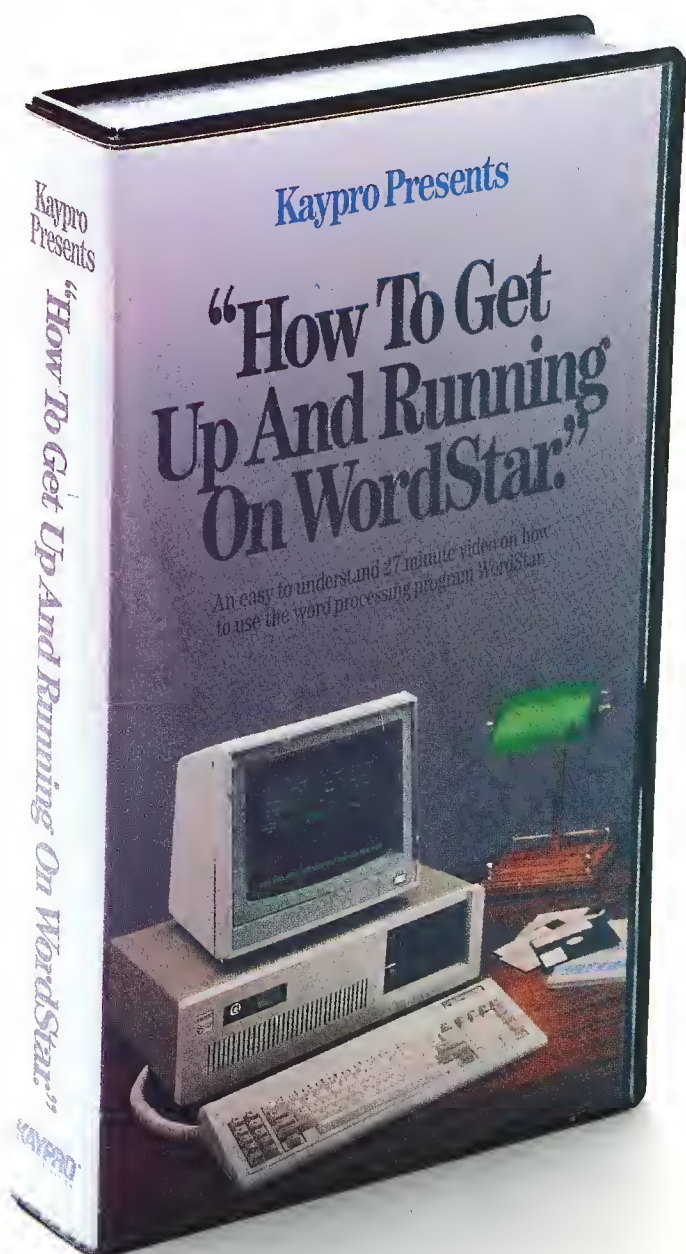
Ad Index

Advertiser	Page No.	Advertiser	Page No.
Advanced Concepts E&C	15	James River Group	Back Cover
Advent Products	42,43	Kaypro Video	Inside Back Cover
Anderson Techno-Products, Inc.	72	PBT Software	19
Axonix	26,54	PDSC Co.	65
CD Marketing	15	PROFILES Magazine	2
CDE Software	63	Second City Software	1
Central Computer Products	10,11,21	Southwest Computing	60
Computer Friends	8	Spectre Technologies	47
Computer Museum	68	Traveling Software	44,45
Computer Professionals, Inc.	17	Video Microsystems, Inc.	27
EZ Systems	63	Wall Street Journal	5
High Tech Research	Inside Front Cover	Woodsmith Software	53
Hurd Computers Systems	7	Workman & Associates	19
Intersecting Concepts	25	Xpert Software	31
J & D Associates	67		



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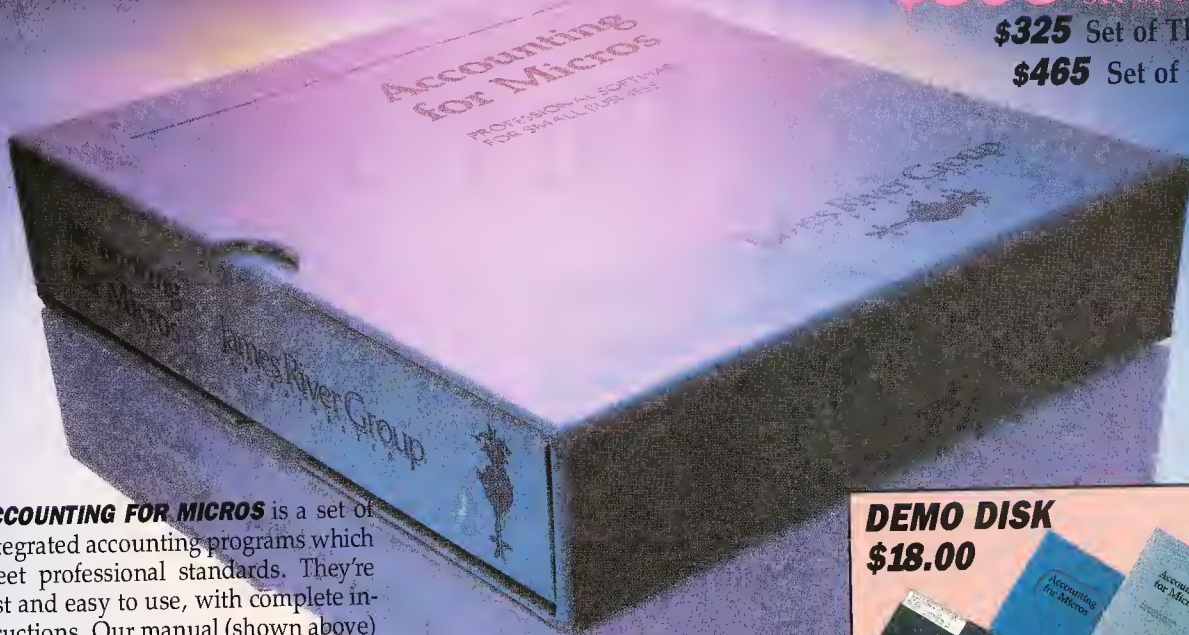
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